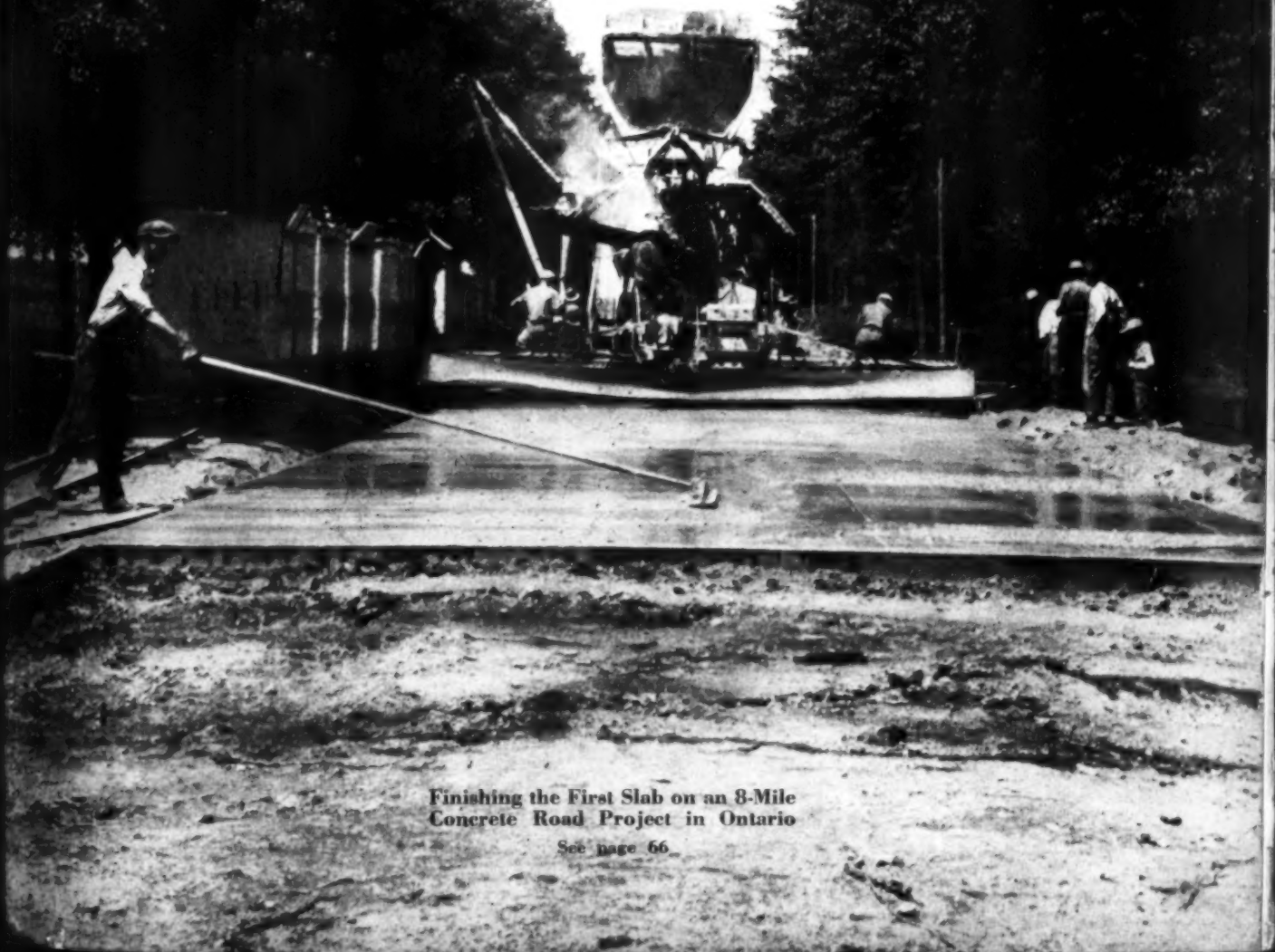


SEPTEMBER, 1929

25 Cents, \$1 a Year

67

# Contractors *and* Engineers Monthly



Finishing the First Slab on an 8-Mile  
Concrete Road Project in Ontario

See page 66

# and in 1929

more Center Drive  
machines are being  
bought than ever  
before—

There must be  
Something to it.  
Investigate before  
you buy.....

**THEW**

LORAIN 55-60-75

231%  
THEW  
CENTR  
DRIVE  
1928

188%  
THEW  
CENTR  
DRIVE  
1927

135%  
THEW  
CENTR  
DRIVE  
1926

100%  
THEW  
CENTR  
DRIVE  
1925

THE THEW SHOVEL  
COMPANY  
Lorain, Ohio

Shovels - Cranes - Draglines  
Backhoes - Locomotive Cranes  
Gasoline, Diesel, Electric  
and Steam Power



# Where to Purchase

A comprehensive classification of the leading machinery and supply manufacturers arranged for the convenience of contractors, engineers and public officials who may wish to secure information about construction equipment.

The Index of Advertisers faces the inside back cover. When writing to advertisers please mention the CONTRACTORS & ENGINEERS MONTHLY. A star (\*) before the manufacturer's name indicates that his advertisement appears in this issue.

This index is published as an aid to the reader, but the publishers assume no responsibility for errors or omissions.

## AIR COMPRESSORS

- \*Allis-Chalmers Mfg. Co., Frankfort, N. Y.
- \*Buhl Company, Chicago
- \*Domestic Eng. & Pump Co., Shippensburg, Pa.
- \*Independent Pn. Tool Co., Chicago, Ill.
- \*New Engine Co., Lansing, Mich.
- \*O. K. Clutch & Mach. Co., Columbia, Pa.
- \*Stever Mfg. & Eng. Co., Freeport, Ill.
- \*Sullivan Machinery Co., Chicago
- \*Ame Road Machy. Co., Frankfort, N. Y.
- \*American Steam Pump Co., Battle Creek, Mich.
- \*Barne Mfg. Co., Mansfield, O.
- \*Cement-Gun Co., Allentown, Pa.
- \*Chicago Pneumatic Tool Co., N. Y.
- \*Cook Motor Co., Delaware, O.
- \*Curtis Pneumatic Machy. Co., St. Louis, Mo.
- \*De Laval Steam Turbine Co., Trenton, N. J.
- \*Fairbanks, Morse & Co., Chicago.
- \*Gardner-Denver Co., Quincy, Ill.
- \*General Electric Co., Schenectady, N. Y.
- \*Hardie-Tyres Mfg. Co., Birmingham, Ala.
- \*Indiana Air Pump Co., Indianapolis, Ind.
- \*Ingersoll-Rand Co., N. Y.
- \*Nordberg Mfg. Co., Milwaukee, Wis.
- \*Norwalk Iron Works Co., So. Norwalk, Conn.
- \*Schramm, Inc., West Chester, Pa.
- \*United Iron Works, Kansas City, Mo.
- \*Westinghouse Traction Brake Co., Wilmerding, Pa.
- \*Worthington Pump & Machinery Corp., N. Y.

## AIR COMPRESSORS, PORTABLE

- \*Buhl Co., Chicago
- \*Domestic Eng. & Pump Co., Shippensburg, Pa.
- \*Independent Pn. Tool Co., Chicago
- \*O. K. Clutch & Mach. Co., Columbia, Pa.
- \*Sullivan Machinery Co., Chicago
- \*Cement-Gun Co., Allentown, Pa.
- \*Chain Belt Co., Milwaukee, Wis.
- \*Chicago Pneumatic Tool Co., New York
- \*Curtis Pneumatic Machy. Co., St. Louis, Mo.
- \*Ingersoll-Rand Co., New York
- \*Metalweld, Inc., Philadelphia, Pa.
- \*National Brake & Electric Co., Milwaukee
- \*Schramm, Inc., West Chester, Pa.
- \*Simons Paint Spray Brush Co., Dayton, O.

## ARTESIAN WELL DRILLS & PUMPS

- American Well Works, Aurora, Ill.
- Ingersoll-Rand Co., New York
- Star Drilling Machine Co., Akron, O.

## ASPHALT

- \*Barber Asphalt Co., Philadelphia
- \*Barrett Co., N. Y.
- \*Standard Oil Co. (Ind.), Chicago
- \*Standard Oil Co. (N. Y.), N. Y.
- \*Atlantic Ref. & Asph. Corp., Philadelphia
- \*Gulf Refining Co., Pittsburg
- \*Ky. Rock Asph. Co., Louisville, Ky.
- \*Natural Rk. Asph. Corp., Owensboro, Ky.
- \*New Orleans Ref. Co., New Orleans, La.
- \*Pioneer Asph. Co., Lawrenceville, Ill.
- \*Sinclair Ref. Co., Chicago
- \*Standard Oil Co. of Cal., S. Francisco
- \*Standard Oil Co. of La., N. Orleans
- \*Standard Oil Co. of N. J., Newark
- \*Texas Co., N. Y.
- \*Utah Rock Asphalt Corp., Pueblo, Colo.
- \*Warren Bros. Co., Boston

## ASPHALT BLOCK

- Hastings Pavement Co., N. Y.

## ASPHALT BRICK

- Asphalt Brick Co., St. Louis

## ASPHALT CUTTERS

- \*Independent Pneumatic Tool Co., Chicago
- \*Sullivan Machinery Co., Chicago
- \*Chicago Pneumatic Tool Co., N. Y.
- \*Cleveland Rock Drill Co., Cleveland, O.
- \*Dayton Pneum. Tool Co., Dayton, O.
- \*Gardner-Denver Co., Quincy, Ill.
- \*Ingersoll-Rand Co., N. Y.

Littleford Bros., Cincinnati.

## ASPHALT KETTLES (See Kettles for Asphalt and Tar Heating)

## ASPHALT PLANTS, TOOLS, ETC.

- \*American Fork & Hoe Co., Cleveland, O.
- \*Barber Asphalt Co., Philadelphia
- \*Chausse Oil Burner Co., Elkhart, Ind.
- \*Connery & Company, Philadelphia
- \*Aeroli Burner Co., West New York, N. J.
- \*American Fin-Mix Co., Chicago
- \*Charleroi Iron Wks., Charleroi, Pa.
- \*F. D. Cummer & Son Co., Cleveland, O.
- \*J. D. Farasey Mfg. Co., Cleveland, O.
- \*Hetherington & Berner, Indianapolis
- \*Hauck Mfg. Co., Brooklyn, N. Y.
- Littleford Bros., Cincinnati
- \*Merriman Asphalt Plant, Inc., Lima, O.
- \*Warren Bros. Co., Boston

## ASPHALT POURING POTS (See Pots, Asphalt Pouring)

## ASPHALT ROLLERS (See Road Rollers)

## ASPHALT SURFACE HEATERS

- \*Barber Asphalt Co., Philadelphia
- \*Chausse Oil Burner Co., Elkhart, Ind.
- \*Aeroli Burner Co., West New York, N. J.
- \*Equitable Asph. Maint. Co., Kan. City, Mo.
- \*Hauck Mfg. Co., Brooklyn, N. Y.

## BACKFILLERS

- \*Baker Mfg. Co., Springfield, Ill.
- \*Bay City Shovels, Inc., Bay City, Mich.
- \*Bucyrus-Erie Co., Erie, Pa.
- \*General Wheelbarrow Co., Cleveland
- \*Kochring Co., Milwaukee, Wis.
- \*Osage Company, Marion, Ohio
- \*Parsons Co., Newton, Ia.
- \*Austin Mach. Corp., Muskegon, Mich.
- \*Buckeye Trac. Ditcher Co., Findlay, O.
- \*Byers Mach. Co., Ravenna, O.
- \*Construction Machy. Co., Waterloo, Ia.
- \*Ersted Mfg. Co., Portland, Ore.
- \*General Excavator Co., Marion, O.
- \*Harnischfeger Corp., Milwaukee, Wis.
- \*LaPlant-Choate Mfg. Co., Cedar Rapids, Iowa
- \*Link-Belt Co., Chicago
- \*Miami Trailer-Scraper Co., Troy, O.
- \*Orion Crane & Shovel Co., Chicago
- \*Star Drilling Mach. Co., Akron, O.
- \*Speeder Mch. Corp., Cedar Rapids, Iowa
- \*Waterman Corp., Detroit
- \*Weller Mfg. Co., Chicago

## BAGS

- Bates Valve Bag Corp., Chicago

## BAG TRUCKS

- Bates Valve Bag Corp., Chicago
- Case Crane & Engg. Co., Columbus, O.

## BAR BENDERS AND CUTTERS

- \*Kochring Co., Milwaukee, Wis.
- \*Ransome Conc. Machy. Co., Dunellen, N. J.
- \*Buffalo Forge Co., Buffalo, N. Y.
- \*Concrete Steel Co., N. Y.
- \*Electric Welding Co., Pittsburgh
- \*D. A. Hinman & Co., Sandwich, Ill.
- \*J. L. Gleason & Co., Boston, Mass.
- \*Kardong Bros., Minneapolis
- \*McKenna Co., Cleveland, O.

## BARRICADE SUPPORTS

- \*Cleveland Steel Spec. Corp., Cleveland, O.

## BAR TIES

- Bates Valve Bag Corp., Chicago
- Symons Clamp & Mfg. Co., Chicago, Ill.

## BATCH BOXES

- \*Blaw-Knox Co., Pittsburgh, Pa.
- \*Butler Bin Co., Waukesha, Wis.
- \*Erie Steel Const. Co., Erie, Pa.
- \*Fairfield Engineering Co., Marion, Ohio
- \*Heitzel Stl. Form & Ir. Co., Warren, O.
- \*Joa. Honherst Co., Cincinnati

- \*Lakewood Eng. Co., Cleveland, O.
- \*Easton Car & Const. Co., Easton, Pa.
- \*Easton Car & Const. Co. of Mo., Kansas O., Mo.
- \*Koppel Ind. Car & Equip. Co., Koppel, Pa.
- Littleford Bros., Cincinnati
- \*Jas. B. Seavers Co., Batavia, Ill.
- \*Western Wheeled Scraper Co., Aurora, Ill.

## BATCHERS (For Measuring Aggregate)

- \*Blaw-Knox Co., Pittsburgh, Pa.
- \*Butler Bin Co., Waukesha, Wis.
- \*Erie Steel Construction Co., Erie, Pa.
- \*Fairfield Engineering Co., Marion, Ohio
- \*Heitzel Stl. Form & Ir. Co., Warren, O.
- \*Superior Engineering Co., Warren, Ohio.

## BEARINGS

- \*Fafnir Bearing Co., New Britain, Conn.
- \*Hyatt Roller Bear. Co., Harrison, N. J.
- \*New Departure Mfg. Co., Bristol, Conn.
- \*S. K. F. Industries, New York
- \*Timken Roller Bearing Co., Canton, O.

## BINS, STORAGE

- \*Austin-Western Ed. Mach. Co., Chicago
- \*Beaumont Mfg. Co., Philadelphia
- \*Blaw-Knox Co., Pittsburgh, Pa.
- \*The Burch Corp., Crestline, Ohio
- \*Butler Bin Co., Waukesha, Wis.
- \*Erie Steel Const. Co., Erie, Pa.
- \*Fairfield Engineering Co., Marion, Ohio
- \*Good Roads Mch. Co., Kennett Sq., Pa.
- \*Heitzel Stl. Form & Ir. Co., Warren, Ohio
- \*Industrial Brownhoist Corp., Cleveland, O.
- \*Ransome Conc. Machy. Co., Dunellen, N. J.
- \*Austin Mfg. Co., Chicago
- \*Birmingham Tank Co., Birmingham, Ala.
- \*Canton Art. Metal Co., Canton, Ohio
- \*Easton Car & Const'n Co., Easton, Pa.
- \*Gallon Iron Works & Mfg. Co., Gallon, Ohio
- \*O. S. Johnson Co., Champaign, Ill.
- \*Lancaster Iron Works, Inc., Lancaster, Pa.
- \*Link-Belt Co., Chicago
- \*Pittsburgh-Des Moines Stl. Co., Pittsburgh, Pa.
- \*Jas. B. Seavers Co., Batavia, Ill.
- \*Superior Engineering Co., Warren, Ohio
- \*Universal Ed. Mach. Co., Kingston, N. Y.
- \*Weller Mfg. Co., Chicago.

## BLADES FOR GRADERS & SNOW FLOWS

- \*Caterpillar Tractor Co., San Leandro, Cal.
- \*General Wheelbarrow Co., Cleveland
- \*J. D. Adams & Co., Indianapolis
- \*Gallon Iron Works & Mfg. Co., Gallon, Ohio
- \*Shunk Mfg. Co., Bucyrus, Ohio

## BLAST HOLE DRILLING MACHINES (See Well Drilling and Blast Hole Machines)

## BLASTING POWDER (See Explosives)

## BLOCKS AND TACKLE

- \*Boston & Lockport Blk. Co., Boston, Mass.
- \*Debbie Fdry. & Mach. Co., Niagara Falls, N.Y.
- \*Western Block Co., Lockport, N. Y.

## BLOW TORCHES

- \*Chausse Oil Burner Co., Elkhart, Ind.
- \*G. H. Williams Co., Erie, Pa.
- \*Everhot Mfg. Co., Maywood, Ill.

## BLUM PRINT MACHINES

- \*Paragon Mach. Co., Rochester, N. Y.
- \*C. F. Pease Co., Chicago
- \*Wickes Bros., Saginaw, Mich.

## BOILERS

- \*Johnston Bros., Inc., Ferrysburg, Mich.
- \*Chandler & Taylor Co., Indianapolis
- \*Chatta. Boiler & Tank Co., Chatta., Tenn.
- \*R. D. Cole Mfg. Co., Newnaa, Ga.
- \*Combustion Eng. Corp., N. Y.
- \*Erie City Iron Works, Erie, Pa.
- \*Hartley Blr. Works, Montgomery, Ala.
- \*Int'l Comb. Eng. Corp., Chattanooga, Tenn.
- \*Heine Boiler Co., St. Louis, Mo.
- \*E. Keeler Co., Williamsport, Pa.

For Directory of Local Distributors of Contractors' Equipment, See Pages 141 to 165

# Where to Purchase

## BOILERS, (Continued)

Ladd Water Tube Bldg. Co., Pittsburgh, Pa.  
V. Loffel & Co., Springfield, Ohio  
Lord & Burnham Co., Irvington, N. Y.  
Murray Iron Works Co., Burlington, Iowa  
Nagle Eng. & Bldg. Works, Erie, Pa.  
New Bern Iron Works & Bldg. Co., New Bern, N. C.  
Petroleum Iron Works Co., Sharon, Pa.  
J. S. Schofield's Sons Co., Macon, Ga.  
Stanwood Corp., Cincinnati, Ohio  
Superior Body Corp., Marion, Ind.  
Vogt, Mch'y. Co., Inc., Louisville, Ky.

## BRACES, TRENCH

\*Templeton, Kenly & Co., Chicago  
Jas. H. Channon Mfg. Co., Chicago  
Duff Mfg. Co., Pittsburgh, Pa.  
Fisher & Hayes Rope & Steel Co., Chicago  
Hawley Mfg. Co., Chicago  
Kalamazoo Fdry. & Mch. Co., Kalamazoo, Mich.  
Waldo Bros. & Bond Co., Boston

## BRANDING TOOLS

Everhot Mfg. Co., Maywood, Ill.

## BRASS GOODS

Glauber Brass, Mfg. Co., Cleveland, Ohio  
Haydenville Co., Haydenville, Mass.  
Hays Mfg. Co., Erie, Pa.  
Mueller Company, Decatur, Ill.  
Union Water Meter Co., Worcester, Mass.  
United-Obendorf Corp., Cleveland, Ohio

## BREAKERS, CONCRETE

\*Independent Pa. Tool Co., Chicago  
\*Sullivan Mch'y. Co., Chicago  
Chicago Pneumatic Tool Co., N. Y.  
Cleveland Rock Drill Co., Cleveland, Ohio  
Gardner-Denver Co., Quincy, Ill.  
Hardsag Wonder Drill Co., Ottumwa, Iowa  
Ingersoll-Rand Co., New York  
Milwaukee Gas Tool Co., Milwaukee  
Rapid Concrete Breaker Co., Los Angeles, Cal.

## BRICK, PAVING (See Paving Brick)

## BRIDGE FLOORS

\*Armco Culvert Mfrs. Assn., Middletown, O.

## BRIDGES AND BUILDINGS, STEEL

\*Blaw-Knox Co., Pittsburgh, Pa.  
\*Frederick Sauer Corporation, N. Y.  
American Bridge Co., N. Y.  
Belleville Bridge & Bldg. Co., Belleville, O.  
Belmont Iron Works, Philadelphia  
Berlin Constr. Co., Berlin, Conn.  
Bethlehem Steel Co., Bethlehem, Pa.  
Boston Bridge Works, Boston  
Butler Mfg. Co., Minneapolis, Minn.  
Central States Br. Co., Indianapolis, Ind.  
Champion Bridge Co., Wilmington, Ohio  
Chesapeake Iron Works, Baltimore, Md.  
Clinton Bridge Works, Clinton, Iowa  
Eastern Bridge & Struc. Co., Worcester, Mass.  
Flour City Orn. Iron Co., Minneapolis  
Fort Pitt Br. Works, Pittsburgh, Pa.  
Hughes-Keenan Co., Mansfield, Ohio  
Ingalls Iron Works Co., Birmingham, Ala.  
Inter. Steel & Iron Co., Evansville, Ind.  
Lakeside Br. & Bldg. Co., No. Milwaukee  
Louisville Br. & Iron Co., Louisville, Ky.  
McClintic Marshall Co., Pittsburgh, Pa.  
Milwaukee Br. Co., Milwaukee, Wis.  
Minn. Bldg. & Mch'y. Co., Minneapolis  
Missouri Vy. Br. & Ir. Co., Leavenworth, Kan.  
Mt. Vernon Br. Co., Mt. Vernon, Ohio  
Penn. Bridge Co., Beaver Falls, Pa.  
Pittsburgh-Des Moines Bldg. Co., Pittsburgh, Pa.  
Richmond Struc. Bldg. Co., Richmond, Va.  
Riverside Br. Co., Martins Ferry, Ohio  
Virginia Br. & Ir. Co., Roanoke, Va.  
Wise Br. & Ir. Co., No. Milwaukee, Wis.

## BROOMS (See Street Sweeping Brooms)

## BUCKETS, AUTOMATIC DUMPING

\*Lakewood Eng. Co., Cleveland, O.  
\*Union Iron Wks., Inc., Hoboken, N. J.  
G. L. Steubner Ir. Wks., Inc., L. I. City, N. Y.

## BUCKETS, CLAM SHELL

\*Blaw-Knox Co., Pittsburgh, Pa.  
\*Erie Steel Const. Co., Erie, Pa.  
\*Geo. Hales Mfg. Co., N. Y.  
\*Hayward Co., N. Y.  
\*Industrial Brownhoist Corp., Cleveland  
\*Lakewood Eng. Co., Cleveland, Ohio  
\*G. H. Williams Co., Erie, Pa.  
Buffalo Hst. & Dcr. Co., Buffalo, N. Y.  
Browning Crane Co., Cleveland, Ohio  
F. A. Coleman Co., Cleveland, Ohio  
J. F. Kiesler Co., Chicago  
Link-Belt Co., Chicago  
McMyler Interstate Co., Cleveland, Ohio  
Mead-Morrison Mfg. Co., E. Boston, Mass.  
Orton Crane & Shovel Co., Chicago  
Owen Bucket Co., Cleveland, Ohio  
Page Eng. Co., Chicago

## BUCKETS, CONCRETE

\*Insley Mfg. Co., Indianapolis, Ind.  
\*Lakewood Eng. Co., Cleveland, Ohio  
\*Ransome Conc. Mch'y. Co., Dunellen, N. J.  
\*Union Iron Works, Inc., Hoboken, N. J.  
Norris K. Davis, San Francisco, Calif.  
Koppel Ind. Car & Equip. Co., Koppel, Pa.  
G. L. Steubner Ir. Wks., Inc., L. I. City, N. Y.

## BUCKETS, DRAGLINE

\*Beaumont Mfg. Co., Philadelphia  
\*Blaw-Knox Co., Pittsburgh, Pa.  
\*Dobbie Fdry. & Mch. Co., Niagara Falls, N. Y.  
\*Hayward Co., New York  
\*Sauerman Bros., Chicago  
Schofield-Burkett Constr. Co., Macon, Ga.  
\*G. H. Williams Co., Erie, Pa.  
Link-Belt Co., Chicago  
Monaghan Mch. Co., Chicago  
Page Eng. Co., Chicago  
Pioneer Bucket Co., Indianapolis, Ind.

## BUCKETS, DREDGING AND EXCAVATING

\*Blaw-Knox Co., Pittsburgh, Pa.  
\*Geo. Hales Mfg. Co., N. Y.  
\*Hayward Co., N. Y.  
\*Industrial Brownhoist Corp., Cleveland  
\*Lakewood Eng. Co., Cleveland, Ohio  
\*G. H. Williams Co., Erie, Pa.  
Browning Crane Co., Cleveland  
J. F. Kiesler Co., Chicago  
Link-Belt Co., Chicago  
Mead-Morrison Mfg. Co., E. Boston, Mass.  
Orton Crane & Shovel Co., Chicago  
Owen Bucket Co., Cleveland, Ohio

## BUCKETS, ORANGE PEEL

\*Hayward Co., N. Y.  
Industrial Works, Bay City, Mich.  
J. F. Kiesler Co., Chicago  
McMyler Interstate Co., Cleveland, Ohio  
Mead-Morrison Mfg. Co., E. Boston, Mass.  
Orton Crane & Shovel Co., Chicago

## BUILDING FORMS (See Forms, Conc.)

## BUILDINGS, STEEL (See Bridges)

## BULLDOZERS

\*Trackson Co., Milwaukee, Wis.  
Miami Trailer-Scrapper Co.  
LaPlant-Chouteau Mfg. Co., Cedar Rapids, Iowa

## BUNKS AND COTS

Ft. Pitt Bedding Co., Pittsburgh, Pa.  
Haggard & Marcusson Co., Chicago  
Southern Rome Co., Baltimore, Md.

## CABLES (See Wire and Cable)

## CABLEWAYS, DRAGLINE

\*Beaumont Mfg. Co., Philadelphia  
\*S. Flory Mfg. Co., Bangor, Pa.  
\*L. P. Green, Chicago  
\*Sauerman Bros., Chicago  
Schofield-Burkett Constr. Co., Macon, Ga.  
Link-Belt Co., Chicago  
Mead-Morrison Mfg. Co., E. Boston, Mass.  
Street Bros. Mch. Works, Chattanooga

## CARS FOR MOTOR TRUCKS

Highland Body Mfg. Co., Cincinnati, Ohio  
Weatherproof Body Corp., Corvallis, Mich.

## CAISSONS

American Bridge Co., N. Y.  
Biggs Boiler Works, Akron, Ohio  
Birmingham Tank Co., Birmingham, Ala.  
Foundation Co., N. Y.  
Bethlehem Steel Co., Bethlehem, Pa.  
O'Rourke Eng. Constr. Co., N. Y.  
Petroleum Ir. Wks. Co., Sharon, Pa.

## CALCIUM CHLORIDE FOR ROADS

\*Dow Chemical Co., Midland, Mich.  
\*Pittsburgh Plate Glass Co., Barberton, O.  
\*Selvay Sales Corp., New York

## CANS FOR GARBAGE AND REFUSE

American Can Co., N. Y.  
Economy Baler Co., Ann Arbor, Mich.  
Rochester Can Co., Rochester, N. Y.  
Solar-Stargis Mfg. Co., Melrose Pk., Ill.  
Witt Cornice Co., Cincinnati, Ohio

## CAR UNLOADERS (See Loaders)

## CARS, INDUSTRIAL V. DUMPING

\*Insley Mfg. Co., Indianapolis, Ind.  
\*Lakewood Eng. Co., Cleveland, Ohio  
Atlas Car & Mfg. Co., Cleveland, Ohio  
Austin Mfg. Co., Chicago  
Case Crane & Engg. Co., Columbus, O.  
Chase Fdry. & Mfg. Co., Columbus, Ohio  
Easton Car & Const. Co., Easton, Pa.  
O. W. Hunt Co., W. New Brighton, N. Y.  
Koppel Ind. Car & Equip. Co., Koppel, Pa.  
G. L. Steubner Ir. Wks., Inc., L. I. City, N. Y.

United Ir. Wks., Inc., Kansas City, Mo.  
Weller Mfg. Co., Chicago  
Whiting Corp., Harvey, Ill.

## CARTS, CONCRETE

\*General Wheelbarrow Co., Cleveland, Ohio  
\*Insley Mfg. Co., Indianapolis, Ind.  
\*Lakewood Eng. Co., Cleveland, Ohio  
\*Lansing Co., Lansing, Mich.  
\*Ransome Conc. Mch'y. Co., Dunellen, N. J.  
Acme Rd. Mch'y. Co., Frankfort, N. Y.  
Case Crane & Engg. Co., Columbus, O.  
Chattanooga Wheelbarrow Co., Chattanooga, Tenn.  
Cleveland Wheelbarrow Co., Cleveland, Ohio  
Easton Car & Const. Co., Easton, Pa.  
E. D. Etnyre & Co., Oregon, Ill.  
Gray Iron Fdry. Co., Reading, Pa.  
Jackson Mfg. Co., Harrisburg, Pa.  
Lee Trailer & Body Co., Plymouth, Ind.  
Sterling Wheelbarrow Co., Milwaukee  
Toledo Wheelbarrow Co., Toledo, Ohio

## CAST IRON PIPE (See Pipe, Cast Iron)

## CASTINGS, STEEL

\*Brown Clutch Co., Sandusky, Ohio  
\*Cleveland Steel Tool Co., Cleveland  
\*G. H. Williams Co., Erie, Pa.  
Farrell-Cheek Steel Fdy. Co., Sandusky, Ohio  
Wheeling Mold & Fdry. Co., Wheeling, W. Va.

## CASTINGS, STREET AND SEWER

\*Armco Culvert Mfrs. Assn., Middletown, Ohio  
\*Central Fdry. Co., N. Y.  
\*U. S. Pipe & Fdry. Co., Burlington, N. J.  
Canton Fdry. & Mch. Co., Canton, Ohio  
E. W. Clark Co., Mattoon, Ill.  
J. B. Glow & Sons, Chicago  
W. E. Dee Co., Chicago  
Donley Bros. Co., Cleveland  
Elkhart Fdry. & Mch. Co., Elkhart, Ind.  
Gallon Iron Works & Mfg. Co., Galena, O.  
Gilbert Mfg. Co., Aberdeen, S. Dak.  
Int'l Comb. Eng. Corp., Chattanooga, Tenn.  
Klauer Mfg. Co., Dubuque, Iowa  
Madison Fdry. Co., Cleveland, Ohio  
Pechstein Iron Works, Keokuk, Iowa  
Sessions Foundry Co., Bristol, Conn.  
South Bend Fdry. Co., So. Bend, Ind.

## CATCH BASINS (See Castings, Street)

## CATCH BASIN CLEANING OUTFITS

Atia Sales Corp., New York  
Elgin Sales Corp., N. Y.  
Mack Trucks, Inc., N. Y.

## CAULKING MACHINERY AND TOOLS

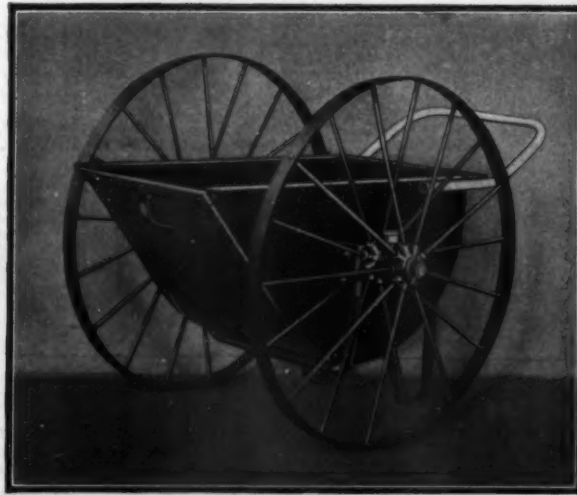
\*Independent Pa. Tool Co., Chicago  
Cleveland Rock Drill Co., Cleveland, Ohio  
Helwig Mfg. Co., St. Paul, Minn.  
Ingersoll-Rand Co., New York  
Mueller Company, Decatur, Ill.

## CEMENT—(P. O. stands for Portland Cement)

\*Pittsburgh Plate Glass Co., Barberton, Ohio  
Acme Cement Corp., Catskill, N. Y.  
Aetna P. C. Co., Detroit, Mich.  
Allentown P. C. Co., Catawauqua, Pa.  
Alpha P. C. Co., Easton, Pa.  
Ash Grove Lime & P. C. Co., Kansas City, Mo.  
Atlas P. C. Co., N. Y.  
Beaver P. C. Co., Portland, Ore.  
Bessemer Limestone & C. Co., Youngstown, O.  
British Col. Cement Co., Victoria, B. C.  
Canada Cement Co., Ltd., Montreal, Canada  
Colorado P. C. Co., Denver, Colo.  
Consolidated Cement Corp., Chicago  
Cowell P. C. Co., Cowell, Cal.  
Crescent P. C. Co., Wampum, Pa.  
Dewey P. C. Co., Kansas City, Mo.  
Diamond P. C. Co., Cleveland, Ohio  
Edison P. C. Co., N. Y.  
Georgia Cement & Stone Co., Birmingham, Ala.  
Giant P. C. Co., Philadelphia, Pa.  
Glens Falls P. C. Co., Glens Falls, N. Y.  
Golden State P. C. Co., Los Angeles, Cal.  
Great West'n P. C. Co., Kansas City, Mo.  
Hawkeye P. C. Co., Des Moines, Iowa  
Hercules Cement Corp., Philadelphia  
Hermitage P. C. Co., Nashville, Tenn.  
Huron P. C. Co., Detroit, Mich.  
International Cement Corp., N. Y.  
International P. C. Co., Ltd., Spokane, Wash.  
Kosmos P. C. Co., Louisville, Ky.  
La Tolteca Compania de Cemento Portland, Mexico City, Mex.  
Lawrence Cement Co., New York  
Lehigh P. C. Co., Allentown, Pa.  
Louisville Cement Co., Louisville, Ky.  
Manitowoc P. C. Co., Manitowoc, Wis.  
Mariboro Cement Co., Edmonton, Can.  
Marquette Cement Mfg. Co., Chicago  
Missouri P. C. Co., St. Louis, Mo.

\* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.\*

The all-around strength of the General Concrete Cart is illustrated by its axle, which is guaranteed unconditionally against breaking or bending. It is made of alloy steel, heat treated and temper drawn to a tremendous degree of toughness. It can't even wear, because of General's renewable steel bushing, a feature to be found on no other concrete buggy.



This steel bushing is renewable. It takes all the wear. You may have to replace the bushing, but the axle will never wear out.

## Mr. Contractor, You Need This Concrete Cart

AS the costs of construction work mount, no contractor can afford to pamper less-than-100% equipment. You are losing money if your materials handling is anything short of top-notch.

A concrete cart demands your attention if it handles more concrete and does it faster. If it further promises indefinitely long life, due to an axle that can't break or even wear, as well as other year-ahead features,—well, Mr. Contractor, you just naturally need this concrete cart.

The 1929 General Concrete Cart has these advantages and others. Let us give you the full story, together with the name of your nearest distributor.

### GENERAL WHEELBARROW COMPANY

Associated Companies:

General Wheelbarrow Company The Empire Plow Company

Headquarters for Wheelbarrows, Concrete Carts, Steel Mortar Boxes, Salamanders, Coal Chutes, Agricultural Implements, Plow Shapes, Scrapers, Road Grader Blades.

3140 East 65th Street

Cleveland, Ohio



### Empire Road Grader Blades

The same specialized strength runs through all General Contractors Equipment and General Highway Equipment. Empire Road Grader Blades, now sold through General distributors, are made of a new special steel which has all the resistance to abrasion of plow steel. They are accurately curved to cut clean and hold their edge. Write for full details.



Please mention the CONTRACTORS AND ENGINEERS MONTHLY—it helps.



# Where to Purchase

## CEMENT (Continued)

Monarch Cement Co., Humboldt, Kas.  
 Monolith P. C. Co., Los Angeles, Cal.  
 National Cement Co., Birmingham, Ala.  
 Nazareth Cement Co., Nazareth, Pa.  
 Nebraska Cement Co., Denver, Colo.  
 Newago P. C. Co., Newago, Mich.  
 New Egyptian P. C. Co., Detroit  
 North Amer. Cement Corp., Albany, N. Y.  
 Northwestern States P. C. Co., Mason City, Ia.  
 Oklahoma P. C. Co., Denver  
 Olympic P. C. Co., Ltd., Seattle  
 Oregon P. C. Co., Portland, Ore.  
 Pacific P. C. Co., San Francisco  
 Peerless P. C. Co., Detroit, Mich.  
 Peninsular P. C. Co., Cement City, Mich.  
 Penn-Allen Cement Co., Nazareth, Pa.  
 Pennsylvania-Dixie Cement Corp., N. Y.  
 Petoskey P. C. Co., Petoskey, Mich.  
 Phoenix P. C. Co., Philadelphia  
 P. C. Co. of Utah, Salt Lake City  
 Pyramid P. C. Co., Des Moines  
 Riverside P. C. Co., Los Angeles  
 St. Marys Cement Co., Toronto, Can.  
 San Antonio P. C. Co., San Antonio  
 Sandusky Cement Co., Cleveland, Ohio  
 Santa Cruz P. C. Co., San Francisco  
 Signal Mountain P. C. Co., Chattanooga, Tenn.  
 Southern States P. C. Co., Rockport, Ga.  
 Southwest P. C. Co., Los Angeles, Cal.  
 Standard P. C. Co., Cleveland  
 Standard P. C. Co., Cleveland  
 Sun P. C. Co., Portland, Ore.  
 Superior P. C. Co., Seattle, Wash.  
 Three Forks P. C. Co., Denver, Colo.  
 Tidewater P. C. Co., Baltimore, Md.  
 Trinity P. C. Co., Dallas, Tex.  
 Union P. C. Co., Denver, Colo.  
 U. S. P. C. Co., Chicago  
 Universal P. C. Co., Chicago  
 Utah Idaho Cement Co., Ogden, Utah  
 Vulcanite P. C. Co., Philadelphia  
 Washash P. C. Co., Detroit  
 Warrior Cement Corp., Chatto, Tenn.  
 Wellston Iron Furnace Co., Jackson, Ohio  
 Wolverine P. C. Co., Coldwater, Mich.  
 Wyandotte P. C. Co., Detroit

## CEMENT BLOCK MACHINES

Abrams Cement Tool Co., Detroit, Mich.  
 Cement Block Machy. Co., Newark, N. J.  
 Eaglemeier Cast Stone Block Machy Co., Bay City, Mich.

## CEMENT GUNS

Cement-Gun Co., Allentown, Pa.

## CEMENT INSPECTION (See Inspecting Laboratories)

## CEMENT TOOLS

American Fork & Hoe Co., Cleveland  
 Abrams Cement Tool Co., Detroit

## CENTRIFUGAL PUMPS (See Pumps, Centrifugal)

## CHAINS

Chain Belt Co., Milwaukee, Wis.  
 Amer. Chain Co., Inc., Bridgeport, Conn.  
 Columbus McKinnon Chain Co., Columbus, O.  
 Diamond Chain & Mfg. Co., Indianapolis, Ind.  
 Jeffrey Mfg. Co., Columbus, Ohio  
 Link-Belt Co., Chicago  
 U. S. Chain & Forge Co., Pittsburgh, Pa.  
 Webster Mfg. Co., Chicago  
 Weller Mfg. Co., Chicago

## CHIMNEYS, CONCRETE

Heine Chimney Co., Chicago  
 East Engineering Co., Pittsburgh, Pa.  
 Weber Chimney Co., Chicago

## CHIMNEYS, RADIAL BRICK

Amer. Chimney Corp., N. Y.  
 Continental Chimney Co. of Chicago, Chicago  
 Alphons Custodia Chimney Const. Co., N. Y.  
 Heine Chimney Co., Chicago  
 H. R. Heinke, Inc., Indianapolis, Ind.  
 M. W. Kellogg & Co., N. Y.  
 Rust Eng. Co., Pittsburgh, Pa.

## CHIMNEYS, STEEL (See Stacks, Steel)

## CHISELS, CHIPPING

Cleveland Steel Tool Co., Cleveland, Ohio

## CHLORINATORS

Wallace & Tiernan Co., Inc., Newark, N. J.  
 Herwood Eng. Co., Florence, Mass.  
 Parson Mfg. Co., Arlington, N. J.

## CHLORINE, LIQUID

(See Liquid Chlorine)

## CHUTES, CONCRETE

Inslay Mfg. Co., Indianapolis, Ind.  
 Lakewood Eng. Co., Cleveland, Ohio  
 Ransome Const. Mch. Co., Dunellen, N. J.

## CLAMPS & TIES, FORM

Inslay Mfg. Co., Indianapolis  
 Batavia Clamp Co., Inc., Batavia, N. Y.  
 Concrete Form-Hold Co., Inc., Culver City, Cal.  
 Concrete Form Tie Corp., Pittsburgh, Pa.  
 Easy-Set Wall Tie Co., Dayton, O.  
 W. A. Kuhlman & Co., Toledo  
 M. & M. Wire Clamp Co., Minneapolis  
 James L. Taylor Mfg. Co., Poughkeepsie, N. Y.  
 Wedgit Tie Co., Inc., New York

## CLAMPS, COLUMN

Ellis & Ford Mfg. Co., Detroit, Mich.  
 Inslay Mfg. Co., Indianapolis, Ind.  
 Black Bros. Co., Mendota, Ill.  
 Concrete Eng. Co., Omaha, Neb.  
 Handy Mfg. Co., Chicago  
 Kardong Bros., Inc., Minneapolis  
 W. A. Kuhlman & Co., Toledo, Ohio  
 M. & M. Wire Clamp Co., Minneapolis  
 The O. D. G. Co., Owensboro, Ky.  
 J. E. Porter Corp., Ottawa, Ill.  
 H. W. Roos Co., Cincinnati  
 Steelform Contracting Co., San Francisco  
 Sterling Wheelbarrow Co., Milwaukee  
 Symons Clamp & Mfg. Co., Chicago  
 James L. Taylor Mfg. Co., Poughkeepsie, N. Y.  
 Universal Form Clamp Co., Chicago  
 Wedgit Tie Co., Inc., New York

## CLAY DIGGERS, PNEUMATIC

Independent Pneu. Tool Co., Chicago  
 Sullivan Machy. Co., Chicago  
 Chicago Pneumatic Tool Co., New York  
 Gardner-Denver Co., Quincy, Ill.  
 Ingersoll-Rand Co., New York

## CLAY PIPE

(See Pipe, Vitrified Clay)

## CLIPS, WIRE ROPE

Amer. Steel & Wire Co., Chicago  
 Amer. Hoist & Derrick Co., St. Paul, Minn.  
 Fischer & Hayes Rope & Steel Co., Chicago  
 Hazard Wire Rope Co., Wilkesbarre, Pa.  
 Thos. Laughlin Co., Portland, Me.  
 Marion Malleable Iron Works, Marion, Ind.  
 C. M. Mockbee & Co., Cincinnati, Ohio  
 John A. Roebeling Sons Co., Trenton, N. J.  
 Upson-Walton Co., Cleveland, Ohio

## CLUTCHES

Brown Clutch Co., Sandusky, Ohio  
 Twin Disc Clutch Co., Racine, Wis.  
 Waukesha Motor Co., Waukesha, Wis.  
 Brown-Lipe Gear Co., Syracuse, N. Y.  
 Link-Belt Co., Chicago

## COOKS, CURE AND CORPORATION

Chapman Valve Mfg. Co., Indian Orchard, Mass.  
 Giesher Brass Mfg. Co., Cleveland, Ohio  
 Haydenville Co., Haydenville, Mass.  
 Hays Mfg. Co., Erie, Pa.  
 Mueller Co., Decatur, Ill.  
 Union Wtr. Mtr. Co., Worcester, Mass.

## COMPRESSORS, AIR (See Air Compressors)

## CONCRETE BLOCK MACHINES (See Cement Block Machines)

## CONCRETE CURING

Barber Asphalt Co., Philadelphia  
 Dow Chemical Co., Midland, Mich.  
 McEverlast, Inc., Los Angeles, Calif.  
 Pittsburgh Plate Glass Co., Barberton, Ohio  
 Selway Sales Corp., New York

## CONCRETE HEATERS

Chaussee Oil Burner Co., Elkhart, Ind.  
 Connery & Co., Philadelphia, Pa.  
 Aeroll Burner Co., West New York, N. J.  
 Hauck Mfg. Co., Brooklyn, N. Y.  
 Littleford Bros., Cincinnati  
 Alex. Milburn Co., Baltimore, Md.

## CONCRETE MIXERS

Amer. Cem. Mch. Co., Inc., Keokuk, Iowa  
 Atlas Engineering Co., Clintonville, Wis.  
 Jaeger Mach. Co., Columbus, Ohio  
 Koehring Co., Milwaukee, Wis.  
 Lakewood Eng. Co., Cleveland, Ohio  
 Lansing Co., Lansing, Mich.  
 John Lawson Mfg. Co., New Helstein, Wis.  
 Ransome Const. Mch. Co., Dunellen, N. J.  
 Acme Rd. Machy. Co., Frankfort, N. Y.  
 Anchor Mfg. Co., Chicago  
 Archer Iron Works, Chicago  
 Badger Con. Mixer Co., Milwaukee  
 Chain Belt Co., Milwaukee, Wis.  
 Construction Mch. Co., Waterloo, Iowa  
 Norris K. Davis, San Francisco, Calif.  
 J. B. Foote Fdry. Co., Fredericktown, Ohio  
 Gray Iron Fdry. Co., Reading, Pa.  
 Judy Mfg. Co., Centerville, Iowa  
 Knickerbocker Co., Jackson, Mich.  
 Kwik-Mix Concrete Mixer Co., Fort Washington, Wis.  
 Leach Co., Oshkosh, Wis.  
 Mixermobile Co., Milwaukee  
 Orr & Sambower, Reading, Pa.

Rommel Mfg. Co., Kewaskum, Wis.  
 Republic Iron Works, Tecumseh, Mich.  
 T. L. Smith Co., Milwaukee

## CONCRETE PAVES (See Pavers, Concrete)

## CONCRETE PILING (See Piling)

## CONCRETE PIPE (See Pipe, Concrete)

## CONCRETE REINFORCEMENT

American Steel & Wire Co., Chicago  
 Truscon Steel Co., Youngstown, Ohio  
 Bethlehem Steel Co., Bethlehem, Pa.  
 Carnegie Steel Co., Pittsburgh, Pa.  
 Concrete Steel Co., N. Y.  
 Consolidated Exp. Metal Co., Wheeling, W. Va.  
 Electric Welding Co., Pittsburgh, Pa.  
 Ft. Pitt Bridge Works, Pittsburgh, Pa.  
 Genfire Steel Co., Youngstown, Ohio  
 Inland Steel Co., Chicago  
 Kalman Steel Co., Chicago  
 Laclede Steel Co., St. Louis, Mo.  
 National Steel Fabric Co., Pittsburgh  
 Republic Iron & Steel Co., Youngstown, Ohio  
 J. T. Ryerson & Son, Chicago  
 Wickwire-Spencer Steel Co., N. Y.  
 Youngstown Pressed Steel Co., Warren, Ohio

## CONCRETE ROAD FINISHERS

Blaw-Knox Co., Pittsburgh, Pa.  
 A. W. French & Co., Chicago  
 Hellett Steel Form & Iron Co., Warren, Ohio  
 Lakewood Eng. Co., Cleveland, Ohio

## CONDENSERS

Allis-Chalmers Mfg. Co., Milwaukee  
 Ingersoll-Rand Co., N. Y.  
 Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.  
 Wheeler Cond. & Eng. Co., Carteret, N. J.  
 Worthington Pump & Machy. Corp., N. Y.

## CONDUIT ROADS

F. Bissell Co., Toledo, Ohio  
 Turbine Sewer Mch. Co., Milwaukee  
 Waldo Bros. & Bond Co., Boston

## CONDUITS, UNDERGROUND

Amer. Vitr. Products Co., Akron, Ohio  
 Johns-Manville, Inc., N. Y.  
 National Fireproofing Co., N. Y.  
 Rice-wil. Co., Cleveland

## CONTRACTORS' EQUIPMENT DEALERS (See Pages 141 to 165)

## CONVEYORS, BELT

Atlas Engineering Co., Clintonville, Wis.  
 Austin-Western Ed. Mch. Co., Chicago  
 Barber-Greene Co., Aurora, Ill.  
 The Burch Corp., Crestline, Ohio  
 Chicago Automatic Conv. Co., Chicago  
 Conveying Weigher Co., New York  
 Fairfield Engineering Co., Marion, Ohio  
 Good Rds. Mch. Co., Kennett Sq., Pa.  
 Geo. Hais Mfg. Co., N. Y.  
 Jos. Honhorst Co., Cincinnati  
 Industrial Brownhoist Corp., Cleveland  
 Austin Mfg. Co., Chicago  
 J. O. Bartlett & Snow Co., Cleveland  
 Chain Belt Co., Milwaukee, Wis.  
 Gallen Iron Works & Mfg. Co., Galien, Ohio  
 Gifford Wood Co., Hudson, N. Y.  
 Jeffrey Mfg. Co., Columbus, Ohio  
 Link-Belt Co., Chicago  
 New Holland Mch. Co., N. Holland, Pa.  
 Northern Conveyor Co., Janesville, Wis.  
 Samuel Olson & Co., Chicago  
 Portable Machinery Co., Clifton, N. J.  
 Robins Conv. Belt Co., N. Y.  
 Jas. B. Seaverns Co., Batavia, Ill.  
 Smith Eng. Wks., Milwaukee  
 Standard Conv. Co., No. St. Paul, Minn.  
 Stephens-Adamson Mfg. Co., Aurora, Ill.  
 Universal Crusher Co., Cedar Rapids, Iowa  
 Webster Mfg. Co., Chicago  
 Weller Mfg. Co., Chicago

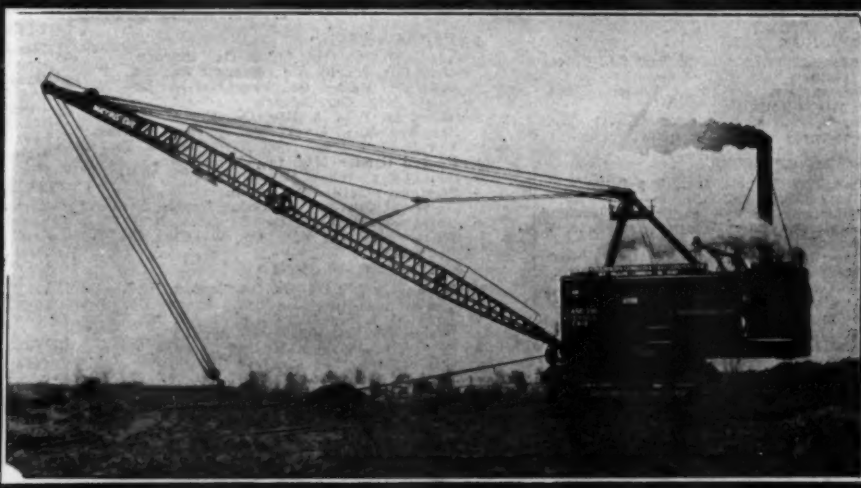
## CONVEYORS, BUCKET

Atlas Engineering Co., Clintonville, Wis.  
 Chicago Automatic Conv. Co., Chicago  
 Conveying Weigher Co., N. Y.  
 Fairfield Engineering Co., Marion, Ohio  
 Good Roads Mch. Co., Kennett Sq., Pa.  
 Geo. Hais Mfg. Co., N. Y.  
 Jos. Honhorst Co., Cincinnati, Ohio  
 Industrial Brownhoist Corp., Cleveland  
 Austin Mfg. Co., Chicago  
 J. O. Bartlett & Snow Co., Cleveland, Ohio  
 H. W. Caldwell & Son, Chicago  
 Chain Belt Co., Milwaukee, Wis.  
 Gifford Wood Co., Hudson, N. Y.  
 Godfrey Conv. Co., Elkhart, Ind.  
 Guarantee Constn. Co., N. Y.  
 Jeffrey Mfg. Co., Columbus, Ohio  
 Link-Belt Co., Chicago  
 Mead-Morrison Mfg. Co., E. Boston, Mass.  
 New Holland Mch. Co., N. Holland, Pa.  
 Samuel Olson & Co., Chicago  
 Republic Rubber Co., Youngstown, Ohio  
 Robins Conv. Belt Co., N. Y.  
 Jas. B. Seaverns Co., Batavia, Ill.

If you find any errors or omissions in this Where to Purchase list, please send corrections to CONTRACTORS AND ENGINEERS MONTHLY

# Proved by years on Mississippi Levee Work

A Class 230 BUCYRUS-ERIE Dragline owned by Lewis-Chambers Construction Company, Inc., at present producing very satisfactory yardage on the Mississippi River



Especially designed and developed  
for conditions on the river

**T**HE FIRST TIME this machine was designed was twelve years ago, in 1917—the first Class 230 BUCYRUS-ERIE dragline was built then, in close cooperation with men who had done flood control work for years.

Constantly improved, and now redesigned in the light of these many years of carefully watched operation, the Class 230 is a machine of definitely known value—that has proved its exact suitability by producing low-cost output over a period of years.

With a six-yard bucket and 150-foot boom, it has a digging reach of 170-180 feet. It is built with ample strength to handle the heaviest digging, and yet because of its minimum weight, and its wide-gauge truck mounting, you can move it easily across soft bottom land. Other examples of its special low-cost operating features are its very economical power units, its water purifier (for steam drive) and its double rail circle that speeds up the swing and cuts down the friction.

For exactly suiting special conditions, the Class 230 dragline is built with special oversize boilers for steam operation. Diesel-electric or electric drive. Each type of drive is very economical of fuel—for example, the coal-burning machine burns only about eleven tons of coal in two 11-hour shifts.

BUCYRUS-ERIE offers you all types of levee-building equipment: Draglines (either general utility machines or special minimum-weight construction) tower excavators and dredges, with all types of power—steam, diesel, gasoline or electric.

Write us, we shall be glad to help you select the machine exactly suited to your needs.

## BUCYRUS-ERIE COMPANY

General Offices: South Milwaukee, Wis.

Plants: South Milwaukee, Wis.; Erie, Pa.; Evansville, Ind.

Adv. 777

Representatives throughout the U. S. A.  
Offices and distributors in all  
principal countries of  
the world.



### BRANCH OFFICES:

Boston	Birmingham	Chicago
New York	Pittsburgh	St. Louis
Philadelphia	Buffalo	Dallas
Atlanta	Detroit	San Francisco

Do you mention the CONTRACTORS AND ENGINEERS MONTHLY when writing? Please do.

# Where to Purchase

## CONVEYORS, BUCKET (Continued)

Stephens Adams Mfg. Co., Aurora, Ill.  
Universal Crusher Co., Cedar Rapids, Iowa  
Webster Mfg. Co., Chicago  
Weller Mfg. Co., Chicago

## CONVEYORS, GRAVITY

Lamson Co., Syracuse, N. Y.  
Logan Co., Louisville, Ky.  
Mathews Conveyor Co., Elwood City, Pa.  
Standard Conv. Co., No. St. Paul, Minn.

## COUPLINGS, ROSE

\*Independent Pneumatic Tool Co., Chicago  
Cleveland Pneum. Tool Co., Cleveland, Ohio  
Gilman Mfg. Co., East Boston, Mass.  
Ingersoll-Rand Co., N. Y.  
W. H. Keller, Inc., Grand Haven, Mich.  
Mulconroy Co., Philadelphia

## CRANES, CRAWLER

\*Bay City Shovel, Inc., Bay City, Mich.  
\*Bucyrus-Erie Co., Erie, Pa.  
\*Industrial Brownhoist Corp., Cleveland  
\*Manitowoc Eng. Works, Manitowoc, Wis.  
\*Osgood Company, Marion, Ohio  
\*Thew Shovel Co., Lorain, Ohio  
\*Trackson Co., Milwaukee  
\*Universal Crane Co., Lorain, Ohio  
Austin Machy. Corp., Muskegon, Mich.  
Byers Mach. Corp., Muskegon, Mich.  
General Excavator Co., Marion, Ohio  
Link-Belt Co., Chicago  
McMyler Interstate Co., Cleveland  
Mead-Morrison Mfg. Co., Boston  
Ohio Power Shovel Co., Lima, O.  
Orton Crane & Shovel Co., Chicago  
Star Drilling Mach. Co., Akron, Ohio

## CRANES, LOCOMOTIVE

\*Bay City Shovel, Inc., Bay City, Mich.  
\*Bucyrus-Erie Co., Erie, Pa.  
\*Industrial Brownhoist Corp., Cleveland  
\*Koeberling Co., Milwaukee  
\*Manitowoc Eng. Works, Manitowoc, Wis.  
\*Osgood Company, Marion, Ohio  
\*Parsons Co., Newton, Iowa  
\*Thew Shovel Co., Lorain, Ohio  
Amer. Hat. & Derrick Co., St. Paul, Minn.  
Browning Crane Co., Cleveland, Ohio  
Davenport Loc. Works, Davenport, Iowa  
Link-Belt Co., Chicago  
Loc. Crane Co. of Amer., Champaign, Ill.  
Marion Steam Shovel Co., Marion, Ohio  
McMyler Interstate Co., Cleveland, Ohio  
Northwest Eng. Works, Chicago  
Ohio Loc. Crane Co., Bucyrus, Ohio  
Orton Crane & Shovel Co., Chicago  
Jas. B. Seaverns Co., Batavia, Ill.  
Speeder Mch. Corp., Cedar Rapids, Iowa  
U. S. Crane Co., Chicago

## CRANES, ONE-TON

Hughes-Keenan Co., Mansfield, Ohio  
Otis Eng. Co., New York  
Sterling Tractor Equipment Co., New York  
Whitehead & Kales Co., Detroit, Mich.

## CRANES, OVERHEAD TRAVELING

\*Erie Steel Const'n. Co., Erie, Pa.  
Alliance Mach. Co., Alliance, O.  
Chesapeake Iron Wks., Baltimore, Md.  
Chisholm-Moore Mfg. Co., Cleveland  
Curtis Pa. Mch. Co., St. Louis  
Harnischfeger Corp., Milwaukee, Wis.  
Milwaukee Elec. Crane Co., Milwaukee  
Morgan Eng. Co., Alliance, O.  
Northern Eng. Wks., Detroit, Mich.  
Shaw-Crane Wks., Muskegon, Mich.  
Shepard Elec. Cr. & Hat. Co., Montour Falls, N. Y.  
Toledo Crane Co., Bucyrus, O.  
Whiting Fdry. & Equip. Co., Harvey, Ill.

## CRANES, TRUCK

\*Universal Crane Co., Lorain, Ohio  
Atlas Sales Corp., New York  
Bay City Fdry. & Mach. Co., Bay City, Mich.  
Browning Crane Co., Cleveland  
Byers Mach. Co., Ravenna, O.  
Erted Mfg. Co., Portland, Ore.  
Orton Crane & Shovel Co., Chicago  
Harnischfeger Corp., Milwaukee, Wis.

## CRANES, WRECHING

\*Bucyrus-Erie Co., Erie, Pa.  
\*Industrial Brownhoist Corp., Cleveland  
Industrial Wks., Bay City, Mich.

## CRAWLER ATTACHMENTS

\*Geo. Hales Mfg. Co., N. Y.  
\*Trackson Co., Milwaukee, Wis.  
Belle City Mfg. Co., Racine, Wis.  
Link-Belt Co., Chicago

## CREEPER WHEELS

\*Creeper Wheel Co., Reading, Pa.

## CROSCOTED BLOCKS, TIMBER, ETC.

Amer. Crocs. Co., Inc., Louisville, Ky.  
Amer. Crocs. Wks., Inc., New Orleans, La.  
Ayer & Lord Tie Co., Chicago  
Carter Bloxmond Flooring Co., E. City, Mo.

Colonial Ore. Co., Inc., Louisville, Ky.  
Compressed Wood Preserv. Co., Cincinnati, O.  
Crocs. Materials Co., New Orleans, La.  
Georgia Crocs. Co., Louisville, Ky.  
Jennison-Wright Co., Toledo, O.  
Long Bell Lumber Co., Kansas City, Mo.  
Midland Crocs. Co., Granite City, Ill.  
Pensacola Croscutting Co., Pensacola, Fla.  
Republic Crocs. Co., Indianapolis, Ind.  
Southern Wood Pres. Co., Atlanta, Ga.  
Wyckoff Pipe & Crocs. Co., N. Y.

## CRUSHERS, ROCK

\*Austin-Western Rd. Mach. Co., Chicago  
\*Good Bds. Machy. Co., Kennett Sq., Pa.  
Arme Rd. Machy. Co., Frankfort, N. Y.  
Austin Mfg. Co., Chicago  
Gallion Ir. Wks. & Mfg. Co., Gallion, O.  
New Eng. Road Machy. Co., So. Boston, Mass.  
New Holland Mach. Co., New Holland, Pa.  
Russell Grader Mfg. Co., Minneapolis  
Smith Eng. Wks., Milwaukee  
Sturtevant Mill Co., Boston  
Universal Crusher Co., Cedar Rapids, Ia.  
Universal Rd. Mch. Co., Kingston, N. Y.  
Wheeling Mold & Fdry. Co., Wheeling, W. Va.

## CULVERTS, CAST IRON

\*U. S. Pipe & Fdry. Co., Burlington, N. J.  
American Casting Co., Birmingham, Ala.  
Amer. C. I. Pipe Co., Birmingham, Ala.  
Beach Mfg. Co., Charlotte, Mich.  
Gallion Iron Wks. & Mfg. Co., Gallion, O.  
Gilbert Mfg. Co., Aberdeen, S. D.  
R. D. Wood & Co., Philadelphia

## CULVERTS, CORRUGATED METAL

\*Armco Culvert Mfrs. Assn., Middletown, O.  
\*Austin-Western Rd. Mach. Co., Chicago  
\*Good Bds. Mach. Co., Kennett Sq., Pa.  
American Casting Co., Birmingham, Ala.  
Austin Mfg. Co., Chicago  
Bark River Bridge & Culv. Co., Bark River, Mich.  
Beach Mfg. Co., Charlotte, Mich.  
Beatrice Steel Tank Mfg. Co., Beatrice, Neb.  
Berger Mfg. Co., Jacksonville, Fla.  
Boardman Co., Okla. City, Okla.  
Burnham Mfg. Co., Woods Cross, Utah  
Calif. Corr. Culv. Co., W. Berkeley, Cal.  
Canada Ingot Ir. Co., Ltd., Guelph, Ont.  
Canton Culv. & Silo Co., Canton, O.  
Corr. Culv. Co., Moberly, Mo.  
Decatur Corncie & Roofing Co., Albany, Ala.  
Dixie Culv. & Metal Co., Atlanta, Ga.  
Dixie Culv. Mfg. Co., Little Rock, Ark.  
Edwards Mfg. Co., Cincinnati  
Gallion Iron Wks. & Mfg. Co., Gallion, O.  
Gilbert Mfg. Co., Aberdeen, S. D.  
R. Hardesty Mfg. Co., Denver, Colo.  
Highway Prod. Mfg. Co., Elmira, N. Y.  
Ind. Corr. Culv. Co., Mason City, Ia.  
Iowa Pure Ir. Co., Des Moines, Ia.  
Kentucky Culvert Mfg. Co., Louisville, Ky.  
Klauser Mfg. Co., Dubuque, Ia.  
Lyle Culv. & Rd. Equip. Co., Minneapolis, Minn.

Md. Culv. & Metal Co., Baltimore  
N. E. Metal Culv. Co., Palmer, Mass.  
Nebraska Culv. & Mfg. Co., Wahoo, Neb.  
New England Metal Culvert Co., Nashua, N. H.  
Newport Culvert Co., Newport, Ky.  
Northfield Ir. Co., Northfield, Minn.  
Northwest's Sheet & Ir. Wks., Wahpeton, N.D.  
Ohio Corr. Culv. Co., Middletown, O.  
W. Q. O'Neill Co., Crawfordsville, Ind.  
Pure Iron Culvert & Mfg. Co., Portland, Ore.  
Road Supply & Metal Co., Tupeka, Kan.  
St. Paul Corr. Co., St. Paul, Minn.  
Stout Falls Metal Culv. Co., Sioux Falls, S. D.  
So. Metal Culv. Co., Salisbury, N. C.  
Spokane Culv. & Tank Co., Spokane, Wash.  
Tenn. Metal Culv. Co., Nashville  
U. S. Br. & Culv. Co., Bay City, Mich.  
Virginia Culvert Corp., Roanoke, Va.  
Western Metal Mfg. Co., Houston, Tex.  
Wheeling Corr. Co., Wheeling, W. Va.  
Wyatt Metal & Blr. Wks., Dallas, Tex.

## CULVERT FORMS

\*Blaw-Knox Company, Pittsburgh, Pa.  
\*Haltzel Steel Form & Iron Co., Warren, O.  
Concrete Form Co., Inc., Syracuse, N. Y.  
Northfield Iron Co., Northfield, Minn.

## CURE BOXES

H. W. Clark Co., Mattoon, Ill.  
J. B. Clow & Sons, Chicago  
Columbian Iron Wks., Chattanooga, Tenn.  
Int'l Comb. Eng. Corp., Chattanooga, Tenn.  
Madison Fdry. Co., Cleveland, O.  
Mueller Co., Decatur, Ill.  
J. S. Schofield's Sons Co., Macon, Ga.  
R. D. Wood & Co., Philadelphia, Pa.

## CURE, CUTTER AND BASE FORMS (See Forms, Concrete)

## CURE GUARDS, STEEL

W. S. Godwin Co., Baltimore

## CURE, STEEL PROTECTED

\*Truscon Steel Co., Youngstown, O.  
Concrete Steel Co., N. Y.

## CURING OF CONCRETE

\*Barber Asphalt Co., Philadelphia  
\*Dow Chemical Co., Midland, Mich.  
\*McEverlast, Inc., Los Angeles, Calif.  
\*Pittsburgh Plate Glass Co., Barberton, Ohio  
\*Solvay Sales Corp., N. Y.

## CUTTERS, PIPE, HAND

\*Ellis & Ford Mfg. Co., Detroit  
Armstrong Mfg. Co., Bridgeport, Ct.  
Barnes Tool Co., New Haven, Ct.  
Erie Tool Works, Erie, Pa.  
Greenfield Tap & Die Corp., Greenfield, Mass.  
Oswego Tool Co., Oswego, N. Y.  
Road Mfg. Co., Erie, Pa.  
Walworth Mfg. Co., Boston

## CUTTERS, ROD AND WIRE

\*Koeberling Co., Milwaukee, Wis.  
Buffalo Forge Co., Buffalo, N. Y.  
Carols Mfg. Co., Sterling, Ill.  
C. D. Edwards Mfg. Co., Albert Lea, Miss.  
Helwig Mfg. Co., St. Paul, Minn.  
M. & M. Wire Clamp Co., Minneapolis  
Morae-Starrett Prod. Co., Oakland, Calif.  
Worthington Pump & Mch. Corp., N. Y.

## CUTTING EDGES

\*Caterpillar Tractor Co., San Leandro, Cal.  
\*General Wheelbarrow Co., Cleveland  
J. D. Adams & Co., Indianapolis, Ind.  
Shunk Mfg. Co., Bucyrus, O.

## CUTTING AND WELDING APPARATUS (See Welding Apparatus)

## CYLINDER HEADS, RICARDO

\*Waukesha Motor Co., Waukesha, Wis.

## DERRICKS, GUY AND STIFF-LEG

\*Clyde Ir. Wks. Sales Co., Duluth, Minn.  
\*Dobbie Fdry. & Mach. Co., Niagara Falls, N.Y.  
\*S. Flory Mfg. Co., Bangor, Pa.  
\*Insley Mfg. Co., Indianapolis, Ind.  
\*J. S. Mundy Hstg. Engine Co., Newark, N. J.  
\*Saugen Derrick Co., Chicago  
Amer. Hat. & Derrick Co., St. Paul, Minn.  
John T. Horton Co., N. Y.  
Lakeside Bridge & Steel Co., N. Milwaukee, Wis.

Lidgerwood Mfg. Co., Elizabeth, N. J.  
National Hstg. Eng. Co., Harrison, N. J.  
Street Bros. Mach. Wks., Chattanooga  
Superior Iron Wks., Superior, Wis.  
Universal Hstg. Machy. Corp., Buffalo

## DERRICKS, PIPE LAYING

\*Dobbie Fdry. & Mach. Co., Niagara Falls  
Lidgerwood Mfg. Co., Elizabeth, N. J.  
Street Bros. Mach. Wks., Chattanooga

## DERRICKS, REVOLVING

\*Clyde Ir. Wks. Sales Co., Duluth, Minn.  
\*Dobbie Fdry. & Mach. Co., Niagara Falls  
Street Bros. Mach. Wks., Chattanooga

## DERRICKS, STEEL

\*Clyde Ir. Wks. Sales Co., Duluth, Minn.  
\*Dobbie Fdry. & Mach. Co., Niagara Falls  
\*Hayward Co., N. Y.  
\*Insley Mfg. Co., Indianapolis, Ind.  
Amer. Hat. & Derrick Co., St. Paul  
Street Bros. Mach. Wks., Chattanooga  
Taylor Port. St. Derrick Co., Chicago

## DERRICKS, STEEL PORTABLE

\*Clyde Ir. Wks. Sales Co., Duluth, Minn.  
\*Dobbie Fdry. & Mach. Co., Niagara Falls  
Amer. Hat. & Derrick Co., St. Paul  
Lidgerwood Mfg. Co., Elizabeth, N. J.  
Street Bros. Mach. Wks., Chattanooga

## DERRICK FITTINGS

\*S. Flory Mfg. Co., Bangor, Pa.  
\*Hayward Co., N. Y.  
\*J. S. Mundy Hstg. Engine Co., Newark, N. J.  
Amer. Hat. & Derrick Co., St. Paul  
Lidgerwood Mfg. Co., Elizabeth, N. J.  
Street Bros. Mach. Wks., Chattanooga

## DIAPHRAGM PUMPING OUTFITS

\*C. H. & E. Mfg. Co., Milwaukee, Wis.  
\*John Lanson Mfg. Co., New Holstein, Wis.

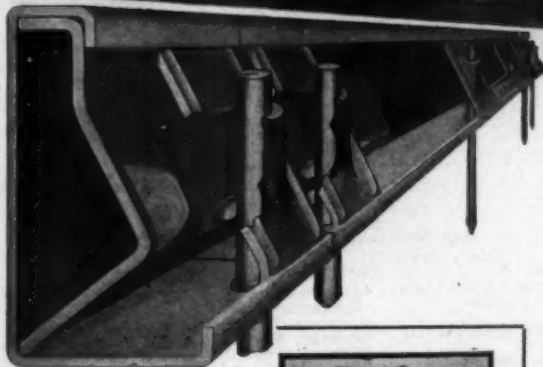
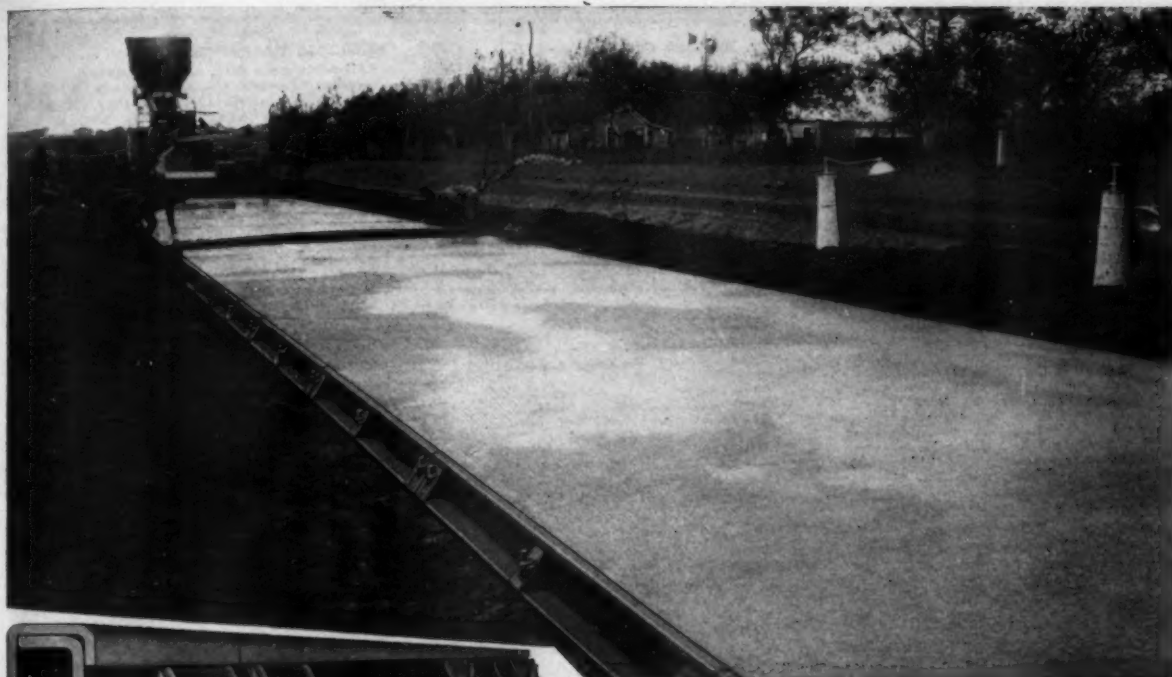
## DIESEL ENGINES (See Engines, Oil)

## DISTRIBUTORS, TAR AND ASPHALT

\*Good Roads Machinery Co., Kennett Sq., Pa.  
K. D. Etnyre & Co., Oregon, Ill.  
Kinney Mfg. Co., Boston  
Municipal Supply Co., So. Bend, Ind.

If you find any errors or omissions in this Where to Purchase list, please send corrections to CONTRACTORS AND ENGINEERS MONTHLY





Right — Heltzel Weighing Plant with springless scale and large dial.

Below—Heltzel bell and spigot pipe form being assembled for pouring.



## Armor Plate to a Battleship Means *Impregnability—* to Heltzel Road Forms *Longer Life*

The heavy armor plate steel used in Heltzel forms insures a much longer life without injuring the alignment, and permits the use of heavy modern road machinery without deflecting top of rail—result, a smooth road.

Heltzel also offers a positive lock which holds stake firmly in form after setting. It also makes possible a quick release so that forms can easily be pulled and moved to another section.

Heltzel Stakes are round, one inch diameter, and made of special steel with heat-treated points which will hold in practically any sub-soil. Combined, you have rigidity and flexibility of forms with convenience of handling.

Get all the facts. Bulletins will be mailed at your suggestion.

**The Heltzel Steel Form & Iron Co.**  
Warren, Ohio

We also manufacture steel form for streets, curb, sidewalk, curb and gutter, manholes, concrete pipe, steel bins, street joint, measuring hoppers, volume and weighing type bridges, bulkheads, sub-grade testers, trail graders, motor boxes, etc.

Please send me literature covering **HELTZEL** Weighing Plants, Armor Plate Road Forms and Pipe Forms.

Name.....  
Company.....  
Address.....

CEM-9-29

# Where to Purchase

## DISTRIBUTING PLANTS, CONCRETE

- \*Inley Mfg. Co., Indianapolis, Ind.
- \*Lakewood Eng. Co., Cleveland, O.
- \*Ransome Conc. Mch. Co., Dunellen, N. J.

## DITCHING MACHINES (See Excavators)

## DOORS AND SHUTTERS, STEEL ROLLING

- Cornell Iron Wks., La. I. City, N. Y.
- Edwards Mfg. Co., Cincinnati, Ohio
- Holzer Sheet Metal Works, New Orleans, La.
- Kinnear Mfg. Co., Columbus, O.
- Jamas Peters & Son, Philadelphia
- St. Paul Corrugating Co., St. Paul, Minn.
- Variety Rolling Door Co., Westerville, O.
- J. G. Wilson Corp., N. Y.

## DRAWS, ROAD

- \*Austin-Western Road Machinery Co., Chicago
- \*Caterpillar Tractor Co., San Leandro, Calif.
- \*General Wheelbarrow Co., Cleveland
- \*Good Roads Machy. Co., Kennett Square, Pa.
- Acme Road Machy. Co., Frankfort, N. Y.
- J. D. Adams & Co., Indianapolis, Ind.
- American Steel Scraper Co., Sidney, Ohio
- Beach Mfg. Co., Charlotte, Mich.
- C. D. Edwards Mfg. Co., Albert Lea, Minn.
- Gallon Iron Works & Mfg. Co., Gallon, O.
- Mishia Scraper Wks., Ucon, Ia.
- Shuster-McLean Scraper Co., Sidney, Ohio
- Stockland Road Machinery Co., Minneapolis
- Western Wheelbarrow Scraper Co., Aurora, Ill.

## DRAWING INKS

- \*Pelican Works, Gunther Wagner, New York
- C. M. Higgins & Co., Brooklyn, N. Y.

## DREDGES

- \*Bay City Shovels, Inc., Bay City, Mich.
- \*Bucyrus-Erie Co., Erie, Pa.
- \*Hayward Co., N. Y.
- \*Osgood Company, Marion, Ohio
- Amer. Steel Dredge Co., Ft. Wayne, Ind.
- Ellicott Machy. Corp., Baltimore
- Marion Steam Shovel Co., Marion, O.
- Orion Crane & Shovel Co., Chicago
- J. S. Schofield's Sons Co., Macon, Ga.
- Stockton Iron Wks., Stockton, Cal.
- Street Bros. Mach. Wks., Chattanooga
- Superior Iron Wks., Superior, Wis.

## DREDGES, DIPPER

- \*Bay City Shovels, Inc., Bay City, Mich.
- \*Bucyrus-Erie Co., Erie, Pa.
- \*Osgood Company, Marion, Ohio
- Amer. Steel Dredge Co., Ft. Wayne, Ind.
- Link-Belt Co., Chicago
- Marion Steam Shovel Co., Marion, O.

## DREDGES, HYDRAULIC

- \*Bucyrus-Erie Co., Erie, Pa.
- Ellicott Mach. Corp., Baltimore
- Marion Steam Shovel Co., Marion, O.
- Morris Mach. Wks., Baldwinville, N. Y.

## DREDGING MACHINERY

- \*B. Flory Mfg. Co., Bangor, Pa.
- \*J. S. Mundy Hsg. Engine Co., Newark, N. J.
- Lidgerwood Mfg. Co., Elizabeth, N. J.
- Street Bros. Mach. Wks., Chattanooga

## DRILL STEEL SHARPENERS (See Sharpeners)

## DRILLS, CORE

- \*Loomis Machine Co., Tiffin, Ohio
- \*McKernan-Terry Drill Co., N. Y.
- \*Sanderson-Cyclone Drill Co., Orrville, O.
- \*Sullivan Machy. Co., Chicago
- Ingersoll-Rand Co., N. Y.

## DRILLS, ROCK

- \*The Buhl Company, Chicago
- \*Loomis Machine Co., Tiffin, Ohio
- \*Sanderson-Cyclone Drill Co., Orrville, O.
- \*Sullivan Machy. Co., Chicago
- Chicago Pneumatic Tool Co., New York
- Cleveland Pneum. Tool Co., Cleveland, O.
- Cleveland Rock Drill Co., Cleveland, O.
- Dalzell Co., Philadelphia
- Gardner-Denver Co., Quincy, Ill.
- Gilman Mfg. Co., E. Boston
- Hardy-Woodruff Drill Co., Ottumwa, Ia.
- Holwig Mfg. Co., St. Paul, Minn.
- Ingersoll-Rand Co., New York
- W. H. Keller, Inc., Grand Haven, Mich.
- Wood Drill Wks., Paterson, N. J.

## DRILLS FOR WELLS AND BLAST HOLES (See Well Drilling Machy.)

## DRUMS, HOLDING

- \*Blaw-Knox Co., Pittsburgh, Pa.
- \*Clyde R. Wks. Sales Co., Duluth, Minn.
- \*Dobbie Pary & Mach. Co., Niagara Falls
- \*Hayward Co., New York
- \*Halsell Steel Form & Ir. Co., Warren, O.
- Street Bros. Mach. Wks., Chattanooga

## DYERS, ASPHALT AND CEMENT

- \*Allis-Chalmers Mfg. Co., Milwaukee
- Amer. Blower Co., Detroit, Mich.
- Atlas Dryer Co., Cleveland, O.
- O. O. Bartlett & Snow Co., Cleveland, O.
- F. D. Cummer & Son Co., Cleveland, O.
- Lancaster Iron Works, Inc., Lancaster, Pa.
- Ruggie-Coles Engineering Co., New York

## DYERS, SAND AND GRAVEL

- \*Chassee Oil Burner Co., Elkhart, Ind.

- \*Jes. Hanherst Co., Cincinnati, O.
- Aeroll Burner Co., West New York, N. J.
- American Process Co., New York
- O. O. Bartlett & Snow Co., Cleveland, O.
- Chase & Lyman, Boston
- Littleford Bros., Cincinnati, O.
- Alex. Milburn Co., Baltimore, Md.

## DUMP BODIES FOR CONCRETE

- Easton Car & Const. Co., Easton, Pa.
- Lee Trailer & Body Co., Plymouth, Ind.

## DUMP BODIES FOR MOTOR TRUCKS

- \*Columbian St. Tank Co., Kansas City, Mo.
- \*Highway Trailer Co., Edgerton, Wis.
- \*Wood Hydr. Hoist & Body Co., Detroit
- Amer. Prod. & Trad. Co., Chicago
- Am. Truck & Body Co., Martinsville, Va.
- Anthony Co., Streator, Ill.
- Atlas Sales Corp., New York
- Columbia Body Corp., Columbia, Pa.
- Detroit Trailer & Mach. Co., Detroit
- Detweiler Mfg. Co., Gallon, O.
- Eagle Wagon Wks., Auburn, N. Y.
- Easton Car & Const. Co., Easton, Pa.
- Gallon All Steel Body Co., Gallon, O.
- Griescom-Russell Co., N. Y.
- Hell Co., Milwaukee
- Herr Dump Car Mfg. Co., Coatesville, Pa.
- Hughes-Keehan Co., Mansfield, O.
- The Hug Co., Highland, Ill.
- Jennings Aut. Dump Body, Roanoke, Va.
- Lee Trailer & Body Co., Plymouth, Ind.
- Mack Trucks, Inc., N. Y.
- Mandt Body Co., Keokuk, Ia.
- Marion Steel Body Co., Marion, O.
- Martin-Parry Corp., York, Pa.
- N. Y. Central Ir. Wks., Hagerstown, Md.
- Pechstein Iron Wks., Keokuk, Ia.
- Stewart Iron Wks. Co., Cincinnati
- Van Dorn Iron Wks. Co., Cleveland, O.

## DUMP CARTS AND WAGONS, HORSE

- \*Austin-Western Road Machy. Co., Chicago
- \*Electric Wheel Co., Quincy, Ill.
- \*Highway Trailer Co., Edgerton, Wis.
- Acme Road Machy. Co., Frankfort, N. Y.
- Acme Wagon Co., Emigsville, Pa.
- J. D. Adams & Co., Indianapolis
- Austin Mfg. Co., Chicago
- Bain Wagon Co., Kenochea, Wis.
- Columbia Body Corp., Columbia, Pa.
- Eagle Wagon Wks., Auburn, N. Y.
- Gilbert Mfg. Co., Aberdeen, S. D.
- G. H. Holtsbog & Bro., Jeffersonville, Ind.
- LaPlant-Chote Mfg. Co., Cedar Rapids, Iowa
- Little Red Wagon Co., Omaha, Neb.
- Leadinghaus-Spenchell Wagon Co., St. Louis
- Russell Grader Mfg. Co., Minneapolis
- Smith Trailer Co., Syracuse, N. Y.
- Stockland Road Machinery Co., Minneapolis
- Streich Bros., Oakbrook, Wis.
- Western Wheelbarrow Scraper Co., Aurora, Ill.

## DUMP WAGONS (ALL STEEL), TRACTOR

- \*Electric Wheel Co., Quincy, Ill.
- \*Euclid Crane & Hotet Co., Euclid, O.
- LaPlant-Chote Mfg. Co., Cedar Rapids, Iowa
- Smith Trailer Co., Syracuse, N. Y.
- Trail-IT Co., St. Paul, Minn.

## DYNAMITE (See Explosives)

## EARTH BORING EQUIPMENT

- \*Highway Trailer Co., Edgerton, Wis.

## EJECTORS, SEWAGE (See Sewage Ejectors)

## ELECTRIC GENERATORS AND MOTORS

- \*Allis-Chalmers Mfg. Co., Milwaukee
- American Motors Co., Cedarburg, Wis.
- The Louis Allis Co., Milwaukee
- Crocker-Wheeler Co., Amper, N. J.
- Fairbanks, Morse & Co., Chicago
- General Electric Co., Schenectady, N. Y.
- Graybar Electric Co., New York
- Ideal Electric & Mfg. Co., Mansfield, O.
- Lincoln Electric Co., Cleveland, O.
- Northwestern Mfg. Co., Milwaukee, Wis.
- Robbins & Myers Co., Springfield, O.
- Wagner Electric Mfg. Co., St. Louis
- Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

## ELECTRIC LAMPS

- General Electric Co., Schenectady, N. Y.
- Westinghouse Lamp Co., N. Y.

## ELECTRIC LIGHTING PLANTS

- \*Allis-Chalmers Mfg. Co., Milwaukee
- Climax Eng. Co., Clinton, Ia.
- Cook Motor Co., Delaware, O.
- Cushman Motor Works, Lincoln, Neb.
- Fairbanks, Morse & Co., Chicago
- Fuller & Johnson Mfg. Co., Madison, Wis.
- General Electric Co., Schenectady, N. Y.
- Graybar Electric Co., New York
- Kohler Co., Kohler, Wis.
- Klauser Mfg. Co., Dubuque, Iowa
- Sunbeam Electric Mfg. Co., Evansville, Ind.
- Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

## ELECTRIC TRANSFORMERS

- \*Allis-Chalmers Mfg. Co., Milwaukee
- General Electric Co., Schenectady, N. Y.
- Kuhlman Electric Co., Bay City, Mich.
- Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

## ELECTRIC WIRES (See Wire)

## ELEVATORS, BUCKET

- \*Atlas Engineering Co., Clintonville, Wis.
- \*Austin-Western Rd. Machy. Co., Chicago
- \*Conveying Weigher Co., N. Y.
- \*Fairfield Engineering Co., Marion, Ohio
- \*Good Rds. Machy. Co., Kennett Sq., Pa.
- \*Geo. Hales Mfg. Co., N. Y.
- \*Industrial Brownhoist Corp., Cleveland
- Abrams Cement Tool Co., Detroit
- Austin Mfg. Co., Chicago
- C. O. Bartlett & Snow Co., Cleveland, O.
- Chain Belt Co., Milwaukee, Wis.
- Gifford-Wood Co., Hudson, N. Y.
- Hendrick Mfg. Co., Carbondale, Pa.
- Jeffrey Mfg. Co., Columbus, O.
- Link-Belt Co., Chicago
- Littleford Bros., Cincinnati
- New Holland Mch. Co., N. Holland, Pa.
- Robins Convertible Belling Co., N. Y.
- Spears-Weiss Machy. Co., Oakland, Cal.
- Stephens-Adams Mfg. Co., Aurora, Ill.
- Univ. Rd. Machy. Co., Kingston, N. Y.
- Webster Mfg. Co., Chicago
- Weller Mfg. Co., Chicago
- Worthington Pump & Mch. Corp., N. Y.

## ELEVATORS, PASSENGER, FREIGHT, ETC.

- Am. Elev. & Mach. Co., Louisville, Ky.
- Atlantic Elev. Co., Inc., Philadelphia
- Bay State Elev. Co., Springfield, Mass.
- Haughton Elev. & Mach. Co., Toledo, O.
- Idlevelln Ir. Wks., Los Angeles, Cal.
- Montgomery Elevator Co., Moline, Ill.
- Otis Elevator Co., N. Y.
- C. Ridgway & Son Co., Coatesville, Pa.
- A. B. See Electric Elevator Co., N. Y.
- Speidel Elevator Corp., Reading, Pa.
- Warner Elevator Mfg. Co., Cincinnati
- Warsaw Elevator Co., Warsaw, N. Y.
- Westinghouse Elec. Elevator Co., E. Pittsburgh, Pa.

## ENGINES, DREDGING

- Murray Iron Works Co., Burlington, Ia.

## ENGINES, GAS AND GASOLINE

- \*Allis-Chalmers Mfg. Co., Milwaukee
- \*Caterpillar Tractor Co., San Leandro, Cal.
- \*Continental Motors Corp., Muskegon, Mich.
- \*Domestic Eng. & Pump Co., Shippensburg, Pa.
- \*Electric Wheel Co., Quincy, Ill.
- \*Evinrude Motor Division, Milwaukee
- \*Hercules Motors Corp., Canton, O.
- \*John Lauson Mfg. Co., New Holstein, Wis.
- \*Le Roi Co., Milwaukee
- \*Nove Engine Co., Lansing, Mich.
- \*Sanderson-Cyclone Drill Co., Orrville, O.
- \*Stover Mfg. & Eng. Co., Freeport, Ill.
- \*Waukesha Motor Co., Waukesha, Wis.
- Alamo Engine Co., Hilldale, Mich.
- Beaver Mfg. Co., Milwaukee, Wis.
- Buda Co., Harvey, Ill.
- Charter Gas Engine Co., Sterling, Ill.
- Chicago Pneumatic Tool Co., N. Y.
- Climax Engineering Co., Clinton, Ia.
- Cook Motor Co., Delaware, O.
- Cushman Motor Works, Lincoln, Neb.
- Ersted Mfg. Co., Portland, Ore.
- Fairbanks, Morse & Co., Chicago
- Foss Gas Engine Co., Springfield, O.
- Fuller & Johnson Mfg. Co., Madison, Wis.
- Hinkley Motors, Inc., Detroit
- F. Van Rosen Hoogendyk, New York
- Ingersoll-Rand Co., New York
- Minneapolis Steel & Machinery Co., Minneapolis, Minn.
- Servel Mfg. Co., Evansville, Ind.
- Sterling Engine Co., Buffalo, N. Y.
- Universal Motor Co., Oakbrook, Wis.
- Weber Engine Co., Kansas City, Mo.
- Wisconsin Motor Mfg. Co., Milwaukee
- Witte Engine Works, Kansas City, Mo.
- Worthington Pump & Mch. Corp., N. Y.

## ENGINES, HOISTING (See Hoists)

## ENGINES, INDUSTRIAL (See Power Plants, Industrial)

## ENGINES, KEROSENE

- \*Electric Wheel Co., Quincy, Ill.
- \*Hercules Motors Corp., Canton, O.
- \*John Lauson Mfg. Co., New Holstein, Wis.
- \*Stover Mfg. & Eng. Co., Freeport, Ill.
- \*Waukesha Motor Co., Waukesha, Wis.
- Alamo Engine Co., Hilldale, Mich.
- Climax Engineering Co., Clinton, Ia.
- Fuller & Johnson Mfg. Co., Madison, Wis.
- Witte Engine Works, Kansas City, Mo.

If you find any errors or omissions in this Where to Purchase list, please send corrections to CONTRACTORS AND ENGINEERS MONTHLY



*Model  
GV-4*

## Modern . . . to the Last Detail—

Completely enclosed, yet adequately ventilated, this new Magneto is truly modern in design.

No expense has been spared to make the GV-4 the outstanding magneto of its time.

This new Magneto is a worthy successor to previous models bearing the name EISEMANN—a Magneto destined to perpetuate a cherished world-wide reputation for high quality.

EISEMANN MAGNETO CORPORATION  
165 BROADWAY - NEW YORK

Detroit

San Francisco

Chicago



# EISEMANN



# Where to Purchase

## ENGINES, OIL, DIESEL

\*Allis-Chalmers Mfg. Co., Milwaukee  
 \*Stover Mfg. & Eng. Co., Freeport, Ill.  
 Anderson Engine & Fdry. Co., Anderson, Ind.  
 Bessemer Gas Eng. Co., Grove City, Pa.  
 Bethlehem Steel Co., Bethlehem, Pa.  
 Buckeye Machinery Co., Lima, O.  
 Busch Sulzer Bros. Diesel Eng. Co., St. Louis  
 Charter Gas Engineering Co., Sterling, Ill.  
 Chicago Pneumatic Tool Co., New York  
 De La Vergne Machinery Co., New York  
 Fairbanks, Morse & Co., Chicago  
 Fulton Iron Works Co., St. Louis  
 Ingersoll-Rand Co., New York  
 Lombard Governor Co., Ashland, Mass.  
 McIntosh & Seymour Corp., Auburn, N. Y.  
 Muncie Oil Engine Co., Muncie, Ind.  
 New London Ship & Eng. Co., Groton, Ct.  
 Nordberg Mfg. Co., Milwaukee, Wis.  
 St. Mary's Oil Eng. Co., St. Charles, Mo.  
 Taylor Machinery Co., Cleveland, O.  
 F. Van Rossum Hoogendyk, New York  
 Weber Engineering Co., Kansas City, Mo.  
 Western Machy. Co., Los Angeles, Cal.  
 Worthington Pump & Mch. Corp., N. Y.

## ENGINES, PUMPING

\*Allis-Chalmers Mfg. Co., Milwaukee  
 \*Hercules Motors Corp., Canton, O.  
 \*Stover Mfg. & Eng. Co., Freeport, Ill.  
 \*Waukesha Motor Co., Waukesha, Wis.  
 Climax Engineering Co., Clinton, Ia.  
 Hooven, Owens, Rentschler Co., Hamilton, O.  
 Murray Iron Works, Burlington, Ia.  
 Nordberg Mfg. Co., Milwaukee  
 Worthington Pump & Mch. Corp., N. Y.

## ENGINES, SWINGING

\*J. S. Mundy Htg. Engine Co., Newark, N. J.  
 Dake Engine Co., Grand Haven, Mich.  
 Lidgerwood Mfg. Co., Elizabeth, N. J.

## EXCAVATING MACHINERY (See Names Under Excavators, also Steam Shovels)

### EXCAVATORS, CABLEWAY

\*Beaumont Mfg. Co., Philadelphia  
 \*Bauer Bros., Inc., Chicago  
 \*Schedfield-Burkett Constr. Co., Macon, Ga.  
 Ersted Mfg. Co., Portland, Ore.  
 Lidgerwood Mfg. Co., Elizabeth, N. J.  
 Link-Belt Co., Chicago  
 Street Bros. Machinery Works, Chattanooga

### EXCAVATORS, CRAWLING TRACTOR

\*Bucyrus-Erie Co., Erie, Pa.  
 \*Geo. Halsey Mfg. Co., New York  
 \*Trackson Co., Milwaukee, Wis.  
 \*Industrial Brownhoist Corp., Cleveland  
 \*Osgood Company, Marion, Ohio  
 W. M. Blair Mfg. Co., Chicago, Ill.  
 Byers Machine Co., Ravenna, O.  
 General Excavator Co., Marion, Ohio

### EXCAVATORS, DITCH AND TRENCH

\*Barber-Greene Co., Aurora, Ill.  
 \*Bay City Shovels, Inc., Bay City, Mich.  
 \*Bucyrus-Erie Co., Erie, Pa.  
 \*Geo. Halsey Mfg. Co., New York  
 \*Hayward Co., New York  
 \*Industrial Brownhoist Corp., Cleveland  
 \*Insley Mfg. Co., Indianapolis, Ind.  
 \*Manitowoc Engr. Wks., Manitowoc, Wis.  
 \*Osgood Company, Marion, Ohio  
 \*Paxson Co., Newton, Ia.

### \*Thew Shovel Co., Lorain, O.

Austin Mach. Corp., Muskegon, Mich.  
 Buckeye Tractor Ditcher Co., Findlay, O.  
 Byers Machine Co., Ravenna, O.  
 Cleveland Trencher Co., Euclid, O.  
 Economy Exc. Co., Iowa Falls, Ia.  
 Ersted Mfg. Co., Portland, Ore.  
 General Excavator Co., Marion, Ohio  
 Keystone Driller Co., Beaver Falls, Pa.  
 Lidgerwood Mfg. Co., Elizabeth, N. J.  
 Link-Belt Co., Chicago  
 Marion Steam Shovel Co., Marion, O.  
 Monaghan Machinery Co., Chicago  
 Ohio Power Shovel Co., Lima, Ohio  
 Orton Crane & Shovel Co., Chicago  
 Owensboro Ditcher & Grader Co., Owensboro, Ky.  
 Speeder Mch. Corp., Cedar Rapids, Ia.  
 Star Drilling Machinery Co., Akron, O.  
 Street Bros. Machine Works, Chattanooga  
 G. T. Topping Machinery Co., Dayton, O.

### EXCAVATORS, DRAG-LINE

\*Bay City Shovels, Inc., Bay City, Mich.  
 \*Beaumont Mfg. Co., Philadelphia  
 \*Bucyrus-Erie Co., Erie, Pa.  
 \*E. F. Green, Chicago  
 \*Hayward Co., New York  
 \*Industrial Brownhoist Corp., Cleveland  
 \*Koeberling Co., Milwaukee  
 \*Manitowoc Engr. Wks., Manitowoc, Wis.  
 \*Osgood Company, Marion, Ohio  
 \*Bauer Bros., Chicago  
 \*Schedfield-Burkett Constr. Co., Macon, Ga.  
 \*Thew Shovel Co., Lorain, O.  
 Amer. Hoisting & Derrick Co., St. Paul  
 Austin Machy. Corp., Muskegon, Mich.  
 Byers Machine Co., Ravenna, O.  
 Economy Exc. Co., Iowa Falls, Ia.  
 Ersted Mfg. Co., Portland, Ore.  
 G. L. Gade, Iowa Falls, Ia.  
 General Excavator Co., Marion, Ohio

Gallion Iron Wks. & Mfg. Co., Gallion, O.  
 Harnischfeger Corp., Milwaukee, Wis.  
 Lidgerwood Mfg. Co., Elizabeth, N. J.  
 Link-Belt Co., Chicago  
 Marion Steam Shovel Co., Marion, O.  
 Monaghan Machine Co., Chicago  
 Ohio Power Shovel Co., Lima, O.  
 Orton Crane & Shovel Co., Chicago  
 Page Engineering Co., Chicago  
 Speeder Mch. Corp., Cedar Rapids, Ia.  
 Star Drilling Machine Co., Akron, O.  
 Street Bros. Machine Works, Chattanooga

## EXPANDED METAL

\*Truscon Steel Co., Youngstown, O.  
 Berger Mfg. Co., Canton, Ohio  
 Consolidated Exp. Metal Co., Wheeling, W. Va.  
 Decatur Corrugated Metal Co., Albany, Ala.  
 Northwestern Exp. Metal Co., Chicago  
 Wheeling Corrugating Co., Wheeling, W. Va.  
 Youngstown Pressed Steel Co., Warren, O.

## EXPANSION JOINT MATERIAL

\*Barber Asphalt Co., Philadelphia  
 \*Barrett Co., New York  
 \*Philip Carey Co., Cincinnati, O.  
 \*W. H. Meadows, Inc., Elgin, Ill.  
 \*Truscon Steel Co., Youngstown, O.  
 Hoosier Asphalt Co., Alexandria, Ind.  
 Pioneer Asphalt Co., Lawrenceville, Ill.  
 Serviced Products Corp., Chicago  
 Texas Co., New York  
 Waring-Underwood Co., Philadelphia

## EXPLOSIVES

Atlas Powder Co., Wilmington, Del.  
 Austin Powder Co., Cleveland, O.  
 Egyptian Powder Co., East Alton, Ill.  
 E. I. Du Pont De Nemours & Co., Wilmington, Del.  
 Equitable Powder Mfg. Co., El Alton, Ill.  
 Giant Powder Co., San Francisco, Cal.  
 Grasselli Powder Co., Cleveland, O.  
 Hercules Powder Co., Wilmington, Del.  
 Ill. Powder Mfg. Co., St. Louis, Mo.  
 King Powder Co., Cincinnati, O.  
 Union Explosives Co., Clarksburg, W. Va.  
 U. S. Powder Co., Terre Haute, Ind.

## FENCING

\*American Steel & Wire Co., Chicago  
 Adrian Wire Fence Co., Adrian, Mich.  
 Amer. Fence & Const. Co., New York  
 Anchor Post Fence Co., New York  
 Cyclone Fence Co., Waukegan, Ill.  
 Dwigging Wire Fence Co., Anderson, Ind.  
 Edwards Mfg. Co., Cincinnati  
 Ill. Wire & Mfg. Co., Joliet, Ill.  
 Ind. Steel & Wire Co., Muncie, Ind.  
 Interlocking Fence Co., Morton, Ill.  
 Keystone Steel & Wire Co., Peoria, Ill.  
 Kokomo Steel & Wire Co., Kokomo, Ind.  
 Mich. Wire Fence Co., Adrian, Mich.  
 Nitselman Bros., Muncie, Ind.  
 Page Stl. & Wire Prod. Corp., Bridgeport, Ct.  
 Pittsburgh Steel Co., Pittsburgh, Pa.  
 Stewart Ir. Wks. Co., Cincinnati, O.  
 Tex. Cyclone Fence Co., Ft. Worth, Tex.  
 Van Dorn Iron Works Co., Cleveland, O.  
 Wayne Iron Works, Wayne, Pa.  
 Wickwire-Spencer Steel Co., New York

## FILING EQUIPMENT, STEEL

Art Metal Constr. Co., Jamestown, N. Y.  
 Berger Mfg. Co., Canton, O.  
 Canton Art Metal Co., Canton  
 Gen. Fireproofing Co., Youngstown, O.  
 Van Dorn Iron Works Co., Cleveland, O.

## FILTERS, OIL

S. F. Bowser & Co., Inc., Ft. Wayne, Ind.

## FILTERS, WATER

Amer. Water Softener Co., Philadelphia, Pa.  
 Cochran Corp., Philadelphia, Pa.  
 Graver Corporation, E. Chicago, Ind.  
 International Filter Co., Chicago  
 Norwood Engineering Co., Florence, Mass.  
 Roberts Filter Co., Darby, Pa.  
 W. B. Seale & Sons, Pittsburgh, Pa.

## FINISHING MACHINES, CONCRETE ROAD

(See Concrete Road Finishers)

## FIRE & POLICE ALARM SYSTEMS

Eagle Signal Sales Corp., Moline, Ill.  
 Gamewell Co., Newton Upper Falls, Mass.  
 Sterling Siren Fire Alarm Co., Rochester, N. Y.

## FIRE ALARM SIRENS

Erick Electric Siren Co., St. Paul, Minn.  
 Federal Sign System, Chicago  
 Hendrie & Bolthoff Mfg. & Sup. Co., Denver, Colo.  
 Holtzer-Cabot Electric Co., Boston  
 Sterling Siren Fire Alarm Co., Rochester, N. Y.  
 Union Water Meter Co., Worcester, Mass.

## FIRE APPARATUS, MOTOR

Ahrens-Fox Fire Eng. Co., Cincinnati, Ohio  
 Amer-La France & Foamite Corp., New York  
 Boyer Fire Apparatus Co., Logansport, Ind.  
 Broadway Motor Fire Apparatus Co., Cortlandt, N. Y.  
 Buffalo Fire Appl. Corp., Buffalo, N. Y.

Hale Fire Pump Co., Conshohocken, Pa.  
 Mack Trucks, Inc., New York  
 Northern Fire Apparatus Co., Minneapolis, Minn.  
 Peter Pirsch & Sons Co., Kenosha, Wis.  
 Prospect Fire Engine Co., Prospect, Ohio  
 Seagrave Co., Columbus, Ohio  
 Watrous Fire Eng. Works, St. Paul, Minn.  
 White Co., Cleveland

## FIRE HOSE (See Hose, Fire)

## FLEXIBLE JOINTS

\*Central Foundry Co., New York  
 \*U. S. Pipe & Fdry. Co., Burlington, N. J.  
 Coldwell-Wilcox Co., Newburgh, N. Y.  
 Crane Co., Chicago  
 United Lead Company, New York

## FLOOD LIGHTING PROJECTORS

B. B. T. Corp., Philadelphia, Pa.  
 Crouse-Hinds Co., Syracuse, N. Y.  
 General Electric Co., Schenectady  
 Sperry Gyroscope Co., Brooklyn, N. Y.

## FLOOD LIGHTS, PORTABLE

\*National Carbide Sales Corp., New York  
 \*Oxweld Acetylene Co., New York  
 General Electric Co., Schenectady, N. Y.  
 Kohler Co., Kohler, Wis.  
 Alexander Milburn Co., Baltimore  
 Westinghouse El. & Mfg. Co., E. Pittsburgh, Pa.

## FLOORING, COMPOSITION

\*Barber Asphalt Co., Philadelphia  
 \*Barrett Co., New York  
 Am. Mason Safety Tr. Co., Lowell, Mass.  
 Johns-Manville, Inc., New York  
 Marine Decking & Sup. Co., Philadelphia, Pa.  
 Franklyn R. Muller & Co., Waukegan, Ill.

## FLOORS, WOOD BLOCK

\*Barrett Co., New York  
 Carter Bloxomend Flooring Co., Kansas City, Mo.  
 Jeannison-Wright Co., Toledo, Ohio  
 Midland Creos. Co., Toledo, Ohio  
 Republic Creos. Co., Indianapolis, Ind.  
 Sou. Wood Preserving Co., Atlanta, Ga.  
 Wyckoff Pipe & Creos. Co., New York

## FLUSH TANKS

Pacific Flush Tank Co., Chicago and N. Y.

## FLUSHERS, STREET (See Street Flushers and Sprinklers)

## FORGES, OIL (Rivet Heating)

Hauck Mfg. Co., Brooklyn, N. Y.  
 Mead-Morrison Mfg. Co., E. Boston

## FORMS, CONCRETE ROAD

\*Blaw-Knox Co., Pittsburgh, Pa.  
 \*Heltzel Stl. Form & Ir. Co., Warren, Ohio  
 \*Lakewood Eng. Co., Cleveland, Ohio  
 \*Truscon Steel Co., Youngstown, Ohio  
 Hotchkiss Stl. Products Co., Binghamton, N. Y.  
 Metal Forms Corp., Milwaukee

## FORMS, CONCRETE PIPE

\*Blaw-Knox Co., Pittsburgh, Pa.  
 \*Heltzel Steel Form & Iron Co., Warren, O.  
 Concrete Form Co., Syracuse, N. Y.  
 Eclipse Mach. Co., Kendallville, Ind.  
 Martin Iron Works, Los Angeles, Cal.  
 Quinn Wire & Iron Works, Boone, Iowa

## FORMS, MANHOLE, PIPE, SEWER, ETC.

\*Blaw-Knox Co., Pittsburgh, Pa.  
 \*Heltzel Stl. Form & Ir. Co., Warren, Ohio

## FORMGRADERS

Ted Carr & Co., Chicago

## FOUNTAINS, DRINKING

Jas. B. Clow & Sons, Chicago  
 Crane Co., Chicago  
 Int'l Comb. Eng. Corp., Chattanooga, Tenn.  
 Murdock Mfg. & Sup. Co., Cincinnati  
 Pure San. Dr. Ftn. Co., Haydensville, Mass.  
 Rundle-Spence Mfg. Co., Milwaukee  
 Stewart Iron Works Co., Cincinnati, Ohio  
 Halsey W. Taylor Co., Warren, Ohio  
 Century Brass Works, Belleville, Ill.

## FRESNOES (See Scrapers, Rotary)

## GAGES, WATER LEVEL

Bristol Co., Waterbury, Conn.  
 Builders Iron Foundry, Providence, R. I.  
 W. & L. E. Gurley, Troy, N. Y.  
 Lunkenheimer Co., Cincinnati, Ohio  
 Simplex Valve & Meter Co., Phila.  
 Walworth Mfg. Co., Boston

If you find any errors or omissions in this Where to Purchase list, please send corrections to CONTRACTORS AND ENGINEERS MONTHLY



The above illustration shows the independent self-cleaning action of the Topping Pony-Ditcher Excavator Bucket. The back is forced forward automatically when the excavator bucket goes over the head sprocket. This positive action kicks the material directly onto the cross conveyor by gravity. It requires no additional power and reduces bucket wear.



This shows the individually self-cleaning Topping Pony-Ditcher bucket with the back in normal digging position.



## Self Cleaning Ditcher Buckets, That Really Empty

A man digging a ditch would waste at least thirty-five per cent of his time if he had to stop and scrape off his shovel after each scoop. So it is with a ditching machine, lumps of sticky clay or similar materials clinging to the excavator buckets materially reduce the ditcher's efficiency, and slow up its earning capacity.

One of the chief advantages of The Pony-Ditcher design is its individually self-cleaning buckets that clear materials which would quickly clog up a less efficient cleaning device. Other features are a longer and better built crawler mounting, electrically welded steel frames and ball bearings on all high speed shafts.

Cut your ditching crew to one man and equip him with a Pony-Ditcher . . . You will reduce your overhead, increase your output, and make more money . . . If you are interested in lower ditching costs it will be worth while to write for complete information on The Topping Pony-Ditcher.

The above illustration, at the right, shows the Everglades model Pony-Ditcher digging through sticky muck lands. The self-cleaning bucket feature eliminates all clogging, and enables continuous operation. The extra wide crawler belts allow for digging over very soft ground. Above, at the left, shows the same ditch after one hour of Pony-Ditcher digging.

Industrial Brownhoist Corporation, General Offices, Cleveland, Ohio

District Offices: New York, Philadelphia, Pittsburgh, Detroit, Chicago, New Orleans, San Francisco, Cleveland.

Plants: Brownhoist Division, Cleveland; Industrial Division, Bay City, Michigan; Elyria Foundry Division, Elyria, Ohio.

# INDUSTRIAL BROWNHOIST

**GARBAGE CANS (See Cans)****GARBAGE COLLECTION EQUIPMENT**

\*Highway Trailer Co., Edgerton, Wis.  
 Atlas Sales Corp., New York City  
 Detroit Trailer & Mach. Co., Detroit  
 Freuhart Trailer Co., Detroit, Mich.  
 Heli Co., Milwaukee  
 Geo. H. Holzbog & Bros., Jeffersonville, Ind.  
 Lee Trailer & Body Co., Plymouth, Ind.  
 Littleford Bros., Cincinnati  
 B. Nicoll & Co., New York  
 Smith Trailer Co., Syracuse, N. Y.  
 Troy Trailer & Wagon Co., Troy, Ohio

**GARBAGE DISPOSAL SYSTEMS**

American Beccari Corp., New York  
 C. O. Bartlett & Snow Co., Cincinnati  
 Decarie Incinerator Co., L. I. City, N. Y.  
 Geder Incinerator Corp., Chicago  
 Hiller Eng. & Const. Co., Brooklyn, N. Y.  
 Morse-Boulger Destructor Co., New York  
 Nye Odorous Crematory Co., Macon, Ga.  
 Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.  
 Superior Incinerator Co. of Dallas, Dallas, Tex.

**GASOLINE STORAGE TANKS**

Biggs Boiler Works, Akron, Ohio  
 Birmingham Tank Co., Birmingham, Ala.  
 S. F. Bowser & Co., Inc., Ft. Wayne, Ind.  
 Chicago Bridge & Iron Works, Chicago  
 Graver Corp., East Chicago, Ind.  
 Heli Co., Milwaukee, Wis.  
 Lancaster Iron Works, Inc., Lancaster, Pa.  
 Littleford Bros., Cincinnati, Ohio  
 Wm. B. Seale & Sons, Pittsburgh, Pa.  
 Tekheim Oil Tank & Pump Co., Ft. Wayne, Ind.  
 United Iron Works, Inc., Kansas City, Mo.  
 Wayne Co., Fort Wayne, Ind.

**GATES, SLUICE**

Chapman Valve Mfg. Co., Indian Orchard, Mass.  
 Coffin Valve Co., Boston, Mass.  
 Coldwell-Wilcox Co., Newburgh, N. Y.  
 R. Hardesty Mfg. Co., Denver  
 Rodney Hunt Machine Co., Orange, Mass.  
 Ledlow Valve Mfg. Co., Troy, N. Y.

**GATES FOR PARKS AND CEMETERIES**

Stewart Iron Works Co., Cincinnati, Ohio  
 Wayne Iron Works, Wayne, Pa.

**GLASS, FIREPROOF (See Wire Glass)****GRADERS, ROAD (See Road Graders)****GRADER BLADES**

\*General Wheelbarrow Co., Cleveland, O.  
 J. D. Adams & Co., Indianapolis, Ind.  
 Gallien Jr. Works & Mfg. Co., Gallien, Ohio  
 Russell Grader Mfg. Co., Minneapolis  
 Shunk Mfg. Co., Bucyrus, Ohio

**GRAND STANDS, PORTABLE**

Circle-A Prod. Corp., Newcastle, Ind.  
 Leavitt Mfg. Co., Urbana, Ill.  
 Wayne Iron Works, Wayne, Pa.

**GRATING, STEEL**

\*Blaw-Knox Co., Pittsburgh  
 Hendrick Mfg. Co., Carbondale, Pa.

**GREASE**

\*D-A Lubricant Co., Inc., Indianapolis  
 \*Joa. Dixon Crucible Co., Jersey City, N. J.

**GRIKKIES**

\*Allis-Chalmers Mfg. Co., Milwaukee  
 Austin Mfg. Co., Chicago  
 Robins Conv. Belt Co., New York  
 Smith Engineering Works, Milwaukee  
 Stephens-Adamson Mfg. Co., Angora, Ill.

**GUARD RAIL, HIGHWAY**

\*Am. Steel & Wire Co., Chicago  
 \*Williamsport Wire Rope Co., Williamsport, Pa.  
 Cyclone Fence Co., Waukegan, Ill.  
 W. S. Godwin Co., Baltimore, Md.  
 Hazard Wire Rope Co., Wilkesbarre, Pa.  
 J. H. Ramsey, Albany, N. Y.  
 W. F. Robertson Stl. & Iron Co., Cincinnati  
 Stewart Iron Works Co., Cincinnati  
 Wickwire-Spencer Steel Co., New York

**HAMMERS, STEAM, PILE (See Pile Hammers, Steam)****HEATING KETTLES (See Kettles)****HITCHES**

\*Gustav Schaefer Co., Cleveland, Ohio  
 Detroit Trailer & Machine Co., Detroit  
 Trail-IT Co., St. Paul, Minn.  
 Whitehead & Kales Co., Detroit

**HOISTS, BELT-DRIVEN**

\*Amer. Saw Mill Mch. Co., Hackettstown, N. J.  
 \*Brown Clutch Co., Sandusky, Ohio  
 \*Debbie Fdy. & Mach. Co., Niagara Falls  
 \*Domestic Engine & Pump Co., Shippensburg, Pa.  
 \*J. S. Mundy Hstg. Engine Co., Newark, N. J.  
 American Hoist & Derrick Co., St. Paul, Minn.  
 Lidgerwood Mfg. Co., Elizabeth, N. J.  
 Mead-Morrison Mfg. Co., Boston, Mass.  
 Street Bros. Mach. Works, Chattanooga  
 Universal Hoist & Mfg. Co., Cedar Falls, Ia.  
 Waller Mfg. Co., Chicago  
 William Hoist Co., Los Angeles, Calif.

**HOISTS, CONCRETE, TOWER**

\*Brown Clutch Co., Sandusky, Ohio  
 \*C. H. & E. Mfg. Co., Milwaukee, Wis.  
 \*Domestic Eng. & Pump Co., Shippensburg, Pa.  
 \*Inley Mfg. Co., Indianapolis, Ind.  
 \*Lakewood Eng. Co., Cleveland, Ohio  
 \*J. S. Mundy Hstg. Engine Co., Newark, N. J.  
 \*Nove Engine Co., Lansing, Mich.  
 \*Ransome Conc. Mch. Co., Dunellen, N. J.  
 English Bros. Machy Co., Kansas City  
 Lidgerwood Mfg. Co., Elizabeth, N. J.  
 Mead-Morrison Mfg. Co., Boston  
 Street Bros. Mach. Works, Chattanooga

**HOISTS, ELECTRIC**

\*Brown Clutch Co., Sandusky, Ohio  
 \*C. H. & E. Mfg. Co., Milwaukee, Wis.  
 \*Clyde Iron Works Sales Co., Duluth, Minn.  
 \*Debbie Fdy. & Mach. Co., Niagara Falls  
 \*Domestic Eng. & Pump Co., Shippensburg, Pa.  
 \*S. Flory Mfg. Co., Bangor, Pa.  
 \*Industrial Brownhoist Corp., Cleveland  
 \*J. S. Mundy Hstg. Engine Co., Newark, N. J.  
 \*Nove Engine Co., Lansing, Mich.  
 \*O. K. Clutch & Mach. Co., Columbia, Pa.  
 \*Sterling Machinery Corp., Kansas City, Mo.  
 \*Sullivan Machy Co., Chicago  
 Am. Hoist & Derrick Co., St. Paul, Minn.  
 Chisholm-Moore Co., Cleveland, Ohio  
 Construction Machy Co., Waterloo, Ia.  
 Dake Eng. Co., Grand Haven, Mich.  
 Norris K. Davis San Francisco, Calif.  
 English Bros. Machy Co., Kansas City, Mo.  
 Ersted Mfg. Co., Portland, Ore.  
 Harnischfeger Corp., Milwaukee  
 Lidgerwood Mfg. Co., Elizabeth, N. J.  
 Mead-Morrison Mfg. Co., Boston  
 National Hoisting Eng. Co., Harrison, N. J.  
 Northern Engineering Works, Detroit  
 Street Bros. Mach. Works, Chattanooga  
 Thomas Elevator Co., Chicago  
 Treadwell Engineering Co., Easton, Pa.  
 Universal Hoist & Mfg. Co., Cedar Falls, Iowa  
 Vulcan Iron Works, Wilkes-Barre, Pa.  
 Williams Hoist Co., Los Angeles, Calif.

**HOISTS, GASOLINE**

\*Amer. Cement Mach. Co., Inc., Keokuk, Iowa  
 \*Amer. Saw Mill Mch. Co., Hackettstown, N. J.  
 \*Brown Clutch Co., Sandusky, Ohio  
 \*C. H. & E. Mfg. Co., Milwaukee  
 \*Clyde Iron Works Sales Co., Duluth, Minn.  
 \*Domestic Eng. & Pump Co., Shippensburg, Pa.  
 \*S. Flory Mfg. Co., Bangor, Pa.  
 \*Lansing Co., Lansing, Mich.  
 \*J. S. Mundy Hstg. Engine Co., Newark, N. J.  
 \*Nove Engine Co., Lansing, Mich.  
 \*O. K. Clutch & Mach. Co., Columbia, Pa.  
 \*Sterling Machinery Corp., Kansas City, Mo.  
 Am. Hoist & Derrick Co., St. Paul, Minn.  
 Amer. Mfg. & Eng. Co., Kalamazoo, Mich.  
 Austin Mfg. Co., Chicago  
 Beach Mfg. Co., Charlotette, Mich.  
 Buffalo Hoist & Derrick Co., Buffalo, N. Y.  
 Construction Machy Co., Waterloo, Ia.  
 Dake Eng. Co., Grand Haven, Mich.  
 Dyrr Mfg. Co., Huntington Park, Calif.  
 Norris K. Davis San Francisco, Calif.  
 English Bros. Machy Co., Kansas City, Mo.  
 Ersted Mfg. Co., Portland, Ore.  
 Lidgerwood Mfg. Co., Elizabeth, N. J.  
 Mead-Morrison Mfg. Co., Boston  
 National Hoisting Eng. Co., Harrison, N. J.  
 Orr & Sombower, Reading, Pa.  
 Street Bros. Mach. Works, Chattanooga  
 Thomas Elevator Co., Chicago  
 Universal Hoist & Mfg. Co., Cedar Falls, Iowa  
 Williams Hoist Co., Los Angeles, Calif.

**HOISTS, HAND**

\*Beebe Bros., Inc., Seattle, Wash.  
 \*Debbie Fdy. & Machine Co., Buffalo, N. Y.

**HOISTS, PNEUMATIC**

\*Independent Pneu. Tool Co., Chicago, Ill.  
 \*Sullivan Machy Co., Chicago  
 Chicago Pneumatic Tool Co., New York  
 Curtis Pneumatic Mch. Co., St. Louis  
 Dake Eng. Co., Grand Haven, Mich.  
 Detroit Hoist & Mach. Co., Detroit  
 Gardner-Denver Co., Quincy, Ill.  
 Gilman Mfg. Co., Boston, Mass.  
 Hanna Engineering Works, Chicago

Ingersoll-Rand Co., New York  
 Mead-Morrison Mfg. Co., Boston  
 Northern Eng. Works, Detroit, Mich.  
 Worthington Pump & Mch. Corp., N. Y.

**HOISTS, PORTABLE**

\*Beebe Bros., Inc., Seattle, Wash.  
 \*Brown Clutch Co., Sandusky, Ohio  
 \*C. H. & E. Mfg. Co., Milwaukee, Wis.  
 Ersted Mfg. Co., Portland, Ore.  
 Joliet Mfg. Co., Joliet, Ill.  
 Jas. B. Seaverns Co., Batavia, Ill.

**HOISTS, STEAM**

\*Clyde Iron Works Sales Co., Duluth, Minn.  
 \*S. Flory Mfg. Co., Bangor, Pa.  
 \*J. S. Mundy Hstg. Engine Co., Newark, N. J.  
 \*Sullivan Machinery Co., Chicago  
 Am. Hoist & Derrick Co., St. Paul, Minn.  
 Dake Eng. Co., Grand Haven, Mich.  
 Hardie-Tynes Mfg. Co., Birmingham, Ala.  
 Ingersoll-Rand Co., New York  
 Lidgerwood Mfg. Co., Elizabeth, N. J.  
 Mead-Morrison Mfg. Co., Boston  
 National Hoisting Eng. Co., Harrison, N. J.  
 Orr & Sombower, Reading, Pa.  
 Street Bros. Mach. Works, Chattanooga  
 Thomas Elevator Co., Chicago  
 Treadwell Engineering Co., Easton, Pa.

**HOISTS FOR MOTOR TRUCKS**

\*Beebe Bros., Inc., Seattle, Wash.  
 \*Brown Clutch Co., Sandusky, Ohio  
 \*Wood Hydr. Hoist & Body Co., Detroit  
 Atlas Sales Corp., New York  
 Ersted Mfg. Co., Portland, Ore.  
 Heli Co., Milwaukee  
 Hydr. Hoist Mfg. Co., St. Paul, Minn.  
 Joliet Mfg. Co., Joliet, Ill.  
 Lidgerwood Mfg. Co., Elizabeth, N. J.  
 Van Dorn Iron Works Co., Cleveland, Ohio

**HOPPERS, CONCRETE (Aggregate Measuring)**

\*Blaw-Knox Company, Pittsburgh, Pa.  
 \*Butler Bin Co., Waukesha, Wis.  
 \*Erie Steel Const'n Co., Erie, Pa.  
 \*Kittling Stl. Form & Ir. Co., Warren, Ohio  
 \*Lakewood Eng. Co., Cleveland, Ohio  
 \*Ransome Conc. Mch. Co., Dunellen, N. J.  
 C. S. Johnson Co., Champaign, Ill.  
 Jas. B. Seaverns Co., Batavia, Ill.  
 Superior Engineering Co., Warren, Ohio

**HOSE, AIR**

\*The Buhl Company, Chicago  
 \*Independent Pneu. Tool Co., Chicago  
 Chicago Pneumatic Tool Co., New York  
 Cincinnati Rubber Mfg. Co., Cincinnati  
 Cleveland Rock Drill Co., Cleveland, Ohio  
 The Dallett Co., Philadelphia, Pa.  
 Gilman Mfg. Co., East Boston, Mass.  
 Goodyear Tire & Rubber Co., Akron, Ohio  
 Ingersoll-Rand Co., New York  
 Malconroy Co., Inc., Philadelphia, Pa.  
 Penna. Flexible Metallic Tubing Co., Phila., Pa.  
 Republic Rubber Co., Youngstown, Ohio  
 United States Rubber Co., New York

**HOSE, FIRE**

Bi-Lateral Fire Hose Co., Chicago  
 Eureka Fire Hose Mfg. Co., New York  
 Fabric Fire Hose Co., New York  
 B. F. Goodrich Rubber Co., Akron, Ohio  
 Goodyear Tire & Rubber Co., Akron, Ohio

**HOUSE NUMBERS**

Hamilton Metal Prod. Co., Hamilton, Ohio  
 O. H. Hanson Co., Chicago  
 Niagara Metal Stamping Corp., Niagara Falls, N. Y.

**HOUSES, PORTABLE (See Portable Buildings)****HYDRANTS, FIRE**

Chapman Valve Mfg. Co., Indian Orchard, Mass.  
 Columbian Ir. Works, Chattanooga, Tenn.  
 Darling Valve & Mfg. Co., Williamsport, Pa.  
 Eddy Valve Co., Waterford, N. Y.  
 Iowa Valve Co., Oskaloosa, Iowa  
 Kennedy Valve Mfg. Co., Elmira, N. Y.  
 Ludlow Valve Mfg. Co., Troy, N. Y.  
 Michigan Valve & Fdy. Co., Detroit  
 Norwood Eng. Co., Florence, Mass.  
 Rensselaer Valve Co., Troy, N. Y.  
 A. P. Smith Mfg. Co., E. Orange, N. J.  
 Vogt Bros. Mfg. Co., Louisville, Ky.  
 Watrous Co., St. Paul  
 R. D. Wood & Co., Philadelphia, Pa.

**HYDRAULIC RAMS**

Deming Co., Salem, Ohio

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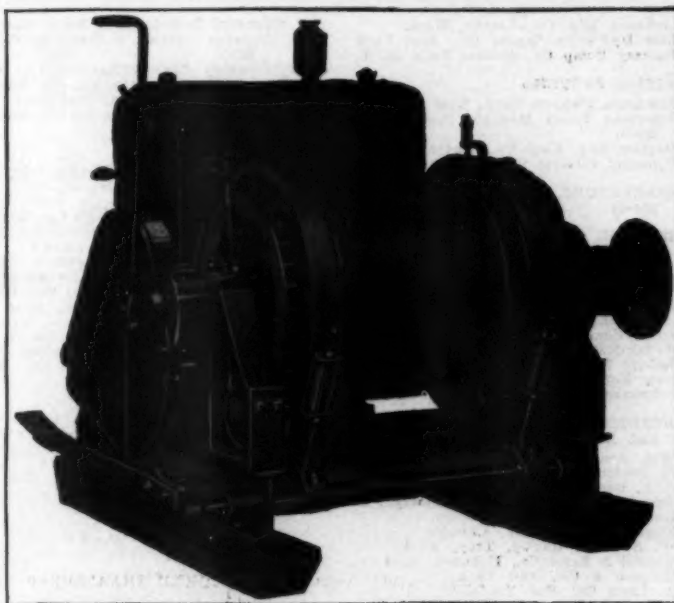


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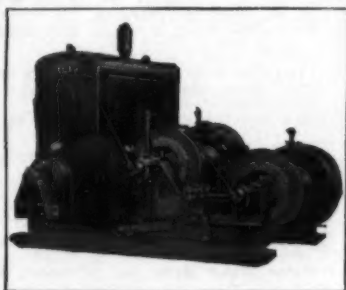
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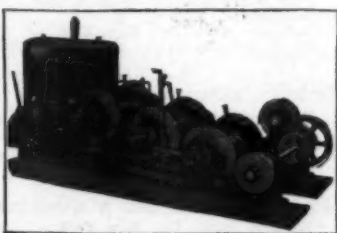
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New Novo WH Two Drum Hoist



New Novo WH Three Drum Hoist  
with boom swinger

Complete your construction jobs quicker. Save a bigger chunk of the contract price for yourself. Lift bigger loads, faster and higher—with the new Novo WH Hoists.

**Speed**—Larger diameter drum provides greater hoisting speed—wider drums give greater cable capacity.

**Easy Control**—Friction blocks of a special asbestos composition bring the loads to a quick, sure stop—wider ventilated brakes eliminate heating—and establish a "finger-tip" control.

**Strength**—The electric welded base—the nickel alloy side frames and gears—the extra wide drum gears—make a far stronger, more rigid construction. Shrouded ratchets can't break and hold the pawl positively in engagement.

**Power**—And Novo double fly-wheel engines provide plenty of surplus power to handle the heavy loads at high speed with close to "steam control."

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NOVO ENGINE COMPANY, 216 Porter St., Lansing, Mich.  
Clarence E. Bement, Vice-Pres. and Gen. Mgr.

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# Where to Purchase

- Johnson Mfg. Co., Seattle, Wash.  
Rife Hydraulic Engine Co., New York  
Rumsey Pump Co., Seneca Falls, N. Y.
- IGNITION SYSTEMS**  
\*Hessmann Magneto Corp., New York  
American Bosch Magneto Corp., Springfield, Mass.  
Dayton Eng. Lab. Co., Dayton, Ohio  
Splittorf Electric Co., Newark, N. J.
- INCINERATORS, GARBAGE (See Garbage Disposal)**
- INDICATOR POSTS (See Valves)**
- INSPECTING LABORATORIES**  
\*Gonard & Busby, Burlington, N. J.  
\*Fatzig Testing Laboratories, Des Moines, Ia.  
Allentown Testing Laboratory, Allentown, Pa.  
E. L. Conwell & Co., Philadelphia, Pa.  
Galick-Henderson Co., New York  
Robert W. Hunt Co., Chicago, Ill.  
New York Testing Lab., New York  
Pittsburgh Testing Lab., Pittsburgh
- INSTRUMENTS AND SUPPLIES (Surveyors' and Engineers')**  
Wm. Ainsworth & Sons, Denver, Col.  
L. Beckman Co., Toledo, Ohio  
O. L. Berger & Sons, Boston  
Brandis & Sons Mfg. Co., Brooklyn, N. Y.  
Buff & Buff Mfg. Co., Boston  
Eugene Dietzen Co., Chicago  
W. & L. E. Gurley, Troy, N. Y.  
Keuffel & Esser Co., Hoboken, N. J.  
Kolesch & Co., New York  
A. Lietz Co., San Francisco  
Leopold-Volpel & Co., Portland, Ore.  
Lufkin Rule Co., Saginaw, Mich.  
Warren-Knight Co., Philadelphia, Pa.  
F. Weber & Co., Philadelphia, Pa.  
David White Co., Milwaukee, Wis.
- INTEGRAL CURB AND BASE FORMS (See Forms, Concrete)**
- IRON WORK, STRUCTURAL AND ORNAMENTAL (See Bridges and Buildings)**
- JACKS, LIFTING**  
\*McKiernan-Terry Drill Co., New York  
\*Templeton, Kenly & Co., Chicago  
Duff Mfg. Co., Pittsburgh, Pa.  
Joyce-Griffland Co., Dayton, Ohio  
A. O. Norton, Inc., Moline, Ill.  
Oil Jack Co., New York  
Rees Mfg. Co., Pittsburgh, Pa.  
Watson-Stillman Company, New York
- JACKS, PIPE FORCING**  
\*Templeton, Kenly & Co., Chicago  
Duff Mfg. Co., Pittsburgh, Pa.  
Easby Mfg. Co., Lincoln, Neb.
- JAIL AND PRISON WORK**  
Fries & Son Steel Const. & Eng. Co., Covington, Ky.  
Manly Jail Works, Dalton, Ga.  
Pearly Jail Building Co., St. Louis, Mo.  
Southern Prison Co., San Antonio, Tex.  
Stewart Iron Works Co., Cincinnati, Ohio  
Van Dorn Iron Works Co., Cleveland
- JOINTS, EXPANSION PAVING (See Expansion Joint Material)**
- JOINTS, FLEXIBLE PIPE (See Flexible Joints)**
- JOINTS, STEEL**  
\*Truscon Steel Co., Youngstown, Ohio  
Berger Mfg. Co., Canton, Ohio  
Gendire Steel Co., Youngstown, Ohio  
Ingalls Steel Prod. Co., Birmingham, Ala.
- KETTLES, FOR ASPHALT AND TAR**  
\*Barber Asphalt Co., Philadelphia, Pa.  
\*Chausse Oil Burner Co., Elkhart, Ind.  
\*Connery & Co., Inc., Philadelphia, Pa.  
\*Good Roads Mfg. Co., Cincinnati, Ohio  
\*Jos. Honhorst Co., Inc., Hoboken, N. J.  
\*Union Iron Works, Inc., Frankfort, N. Y.  
\*Arnold Burner Co., West New York, N. J.  
Beach Mfg. Co., Charlotte, Mich.  
Charleroi Iron Wks., Charleroi, Pa.  
Chase & Lyman, Boston, Mass.  
Hauck Mfg. Co., Brooklyn, N. Y.  
Klaney Mfg. Co., Boston, Mass.  
Lancaster Iron Works, Inc., Lancaster, Pa.  
Littleford Bros., Cincinnati, Ohio  
MacLeod Co., Cincinnati, Ohio  
Spears-Wellis Mch. Co., Oakland, Cal.  
G. L. Stuebner Jr. Wks., Inc., Long Island City, N. Y.  
Tarrant Mfg. Co., Saratoga Springs, N. Y.  
Universal Rd. Mach. Co., Kingston, N. Y.
- LANTHERNS, CONTRACTORS'**  
\*R. E. Dietz Co., New York  
\*Ales. Milburn Co., Baltimore, Md.
- \*National Carbide Sales Corp., New York  
Defiance Lantern & Stamping Co., Rochester, N. Y.  
Economy Electric Lantern Co., Chicago  
Handlan, Bach Mfg. Co., St. Louis  
National Carbon Co., Inc., New York City  
Star Headlight & Lantern Co., Rochester, N. Y.
- LATH, METAL**  
\*Truscon Steel Co., Youngstown, Ohio  
Berger Mfg. Co., Canton, Ohio  
Bostwick Steel Lath Co., Niles, Ohio  
Consolidated Exp. Metals Co., Wheeling, W. Va.  
Decatur Corncase & Roofing Co., Albany, Ala.  
Edwards Mfg. Co., Cincinnati  
Gendire Steel Co., Youngstown, Ohio  
Milwaukee Corr. Co., Milwaukee, Wis.  
Northwestern Exp. Metal Co., Chicago  
Penna. Metal Co., Boston, Mass.  
St. Paul Corr. Co., St. Paul, Minn.  
Sykes Metal Lath and Roofing Co., Niles, O.  
Wheeling Corr. Co., Wheeling, W. Va.  
Youngstown Pressed Steel Co., Warren, O.
- LAWN MOWERS**  
Chadborn & Coldwell Mfg. Co., Newburgh, N. Y.  
Coldwell Lawn Mower Co., Newburgh, N. Y.  
Gilson Mfg. Co., Port Washington, Wis.  
Ideal Power Lawn Mower Co., Lansing, Mich.  
Jacobson Mfg. Co., Racine, Wis.  
Modern Mach. Works, Milwaukee  
Penna. Lawn Mower Works, Philadelphia, Pa.  
Phila. Lawn Mower Co., Philadelphia, Pa.  
S. P. Townsend Co., Bloomfield, N. J.  
Worthington Mower Co., Stroudsburg, Pa.
- LAWN MOWER SHARPENERS**  
Fate-Root-Heath Co., Plymouth, Ohio
- LEAD-MELTING FURNACES**  
Acroll Burner Co., West New York, N. J.  
Chicago Flexible Shaft Co., Chicago  
Hauck Mfg. Co., Brooklyn, N. Y.  
Littleford Bros., Cincinnati, Ohio  
A. P. Smith Mfg. Co., East Orange, N. J.
- LETTERING GUIDES**  
Wood-Regan Inst. Co., So. Orange, N. J.
- LIGHTS, ACETYLENE**  
\*Natl. Carbide Sales Corp., New York  
\*Oxweld Acetylene Co., New York  
General Electric Co., Schenectady, N. Y.  
Kohler Co., Kohler, Wis.  
Alex. Milburn Co., Baltimore, Md.  
Westinghouse El. & Mfg. Co., E. Pittsburgh, Pa.
- LIGHTING STANDARDS (See Street Lamp Posts)**
- LIGHTS, WARNING**  
\*Toledo Pressed Steel Co., Toledo, Ohio  
McCloskey Torch Co., Toledo, Ohio  
National Carbon Co., New York
- LIQUID CHLORINE**  
Arnold, Hoffman & Co., Inc., New York  
Electro Bleaching Gas Co., New York  
Hooker Electrochemical Co., New York  
Mathieson Alkali Works, Inc., New York  
Penna. Salt Mfg. Co., Philadelphia, Pa.
- LOADERS, GRAVEL, WAGON, CAR, ETC.**  
\*Atlas Engineering Co., Clintonville, Wis.  
\*Barber-Greene Co., Aurora, Ill.  
\*Bay City Shovel, Inc., Bay City, Mich.  
\*Bucyrus-Erie Co., Erie, Pa.  
\*Burch Corp., Crestline, Ohio  
\*Chicago Automatic Conv. Co., Chicago  
\*Fairfield Engineering Co., Marion, Ohio  
\*Geo. Hais Mfg. Co., N. Y.  
\*Heltzel St. Form & Ir. Co., Warren, Ohio  
\*Industrial Brownhoist Corp., Cleveland  
\*Nelson Iron Works, Passaic, N. J.  
\*Sawman Bros., Chicago  
\*Truscon Co., Milwaukee, Wis.  
Bonney Supply Co., Inc., Rochester, N. Y.  
Conant Mach. Co., Concord Junction, Mass.  
F. S. Mfg. Co., New Holstein, Wis.  
Gallon Iron Works & Mfg. Co., Gallon, Ohio  
Gifford-Wood Co., Hudson, N. Y.  
Hughes-Keenan Co., Mansfield, Ohio  
Jeffrey Mfg. Co., Columbus, Ohio  
Kent Machine Co., Kent, Ohio  
Lee Trailer & Body Co., Plymouth, Ind.  
Link-Belt Co., Chicago  
Logan Co., Louisville, Ky.  
New Holland Mch. Co., N. Holland, Pa.  
Northern Conveyor Co., Janesville, Wis.  
Portable Machinery Co., Clifton, N. J.  
H. B. Sackett Screen & Chute Co., Chicago  
Spears-Wellis Mch. Co., Oakland, Cal.  
Specialty Engineering Co., Philadelphia, Pa.  
Star Drilling Mach. Co., Akron, Ohio  
Universal Rd. Mach. Co., Kingston, N. Y.  
Weiler Mfg. Co., Chicago
- LOCKERS, STEEL**  
All-Steel Equip. Co., Aurora, Ill.  
Berger Mfg. Co., Canton, Ohio  
Durabilt Steel Locker Co., Aurora, Ill.  
Durand Steel Locker Co., Chicago  
Hart & Hutchinson Co., N. Britain, Conn.  
Lyon Metallic Mfg. Co., Aurora, Ill.  
Fred. Medart Mfg. Co., St. Louis, Mo.  
Narragansett Mach. Co., Providence, R. I.
- LOCOMOTIVES, FOR CONTRACTORS, ETC.**  
Baldwin Loc. Works, Philadelphia, Pa.  
Brookville Locomotive Co., Brookville, Pa.  
Fate-Root-Heath Co., Plymouth, Ohio  
Davenport Loc. Works, Davenport, Iowa  
Heisler Locomotive Works, Erie, Pa.  
Lima Loc. Works, Lima, Ohio  
Mid-West Locomotive Works, Cincinnati  
Milwaukee Loc. Mfg. Co., Milwaukee  
H. K. Porter Co., Pittsburgh, Pa.  
Vulcan Iron Works, Wilkes-Barre, Pa.  
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.  
Geo. D. Whitcomb Co., Rochelle, Ill.
- LUBRICANTS**  
\*D-A Lubricant Co., Indianapolis, Ind.  
\*Joseph Dixon Crucible Co., Jersey City, N. J.  
Texas Co., New York
- LUBRICATORS**  
The Basic Mfg. Co., Chicago  
Carr Fastener Co., Cambridge, Mass.
- MANGANESE STEEL PRODUCTS**  
American Manganese St. Co., Chicago H'ts., Ill.  
Taylor-Wharton Jr. & St. Co., High Bridge, N. J.
- MANHOLE COVERS (See Castings)**
- METAL LATH (See Lath)**
- METAL ROOFING (See Roofing)**
- METER BOXES**  
Builders Iron Foundry, Providence, R. I.  
H. W. Clark Co., Mattoon, Ill.  
Clarkville Fdry. & Mach. Co., Clarksville, Tenn.  
J. B. Clow & Sons, Chicago  
Columbian Iron Works, Chattanooga, Tenn.  
Ford Meter Box Co., Wabash, Ind.  
Mueller Co., Decatur, Ill.  
J. S. Schofield's Sons Co., Macon, Ga.
- METER COUPLINGS**  
\*Neptune Meter Co., New York  
H. W. Clark Co., Mattoon, Ill.  
Ford Meter Box Co., Wabash, Ind.  
Hersey Mfg. Co., So. Boston, Mass.  
Mueller Co., Decatur, Ill.  
Pittsburgh Equitable Meter Co., Pittsburgh, Pa.  
Union Water Meter Co., Worcester, Mass.
- METER TESTERS**  
\*Neptune Meter Co., New York  
H. W. Clark Co., Mattoon, Ill.  
Ford Meter Box Co., Wabash, Ind.  
Mueller Co., Decatur, Ill.  
National Meter Co., New York  
Pittsburgh Equitable Meter Co., Pittsburgh, Pa.
- METERS, ELECTRIC (WATTHOUR)**  
Duncan Elec. Mfg. Co., LaFayette, Ind.  
General Electric Co., Schenectady, N. Y.  
Sangamo Electric Co., Springfield, Ill.  
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
- METERS, WATER, OIL & GASOLINE**  
\*Neptune Meter Co., New York  
Badger Meter Mfg. Co., Milwaukee  
Buffalo Meter Co., Buffalo, N. Y.  
Federal Meter Corp., E. Orange, N. J.  
Gamon Meter Co., Newark, N. J.  
Hersey Mfg. Co., Boston, Mass.  
National Meter Co., New York  
Pittsburgh Equitable Meter Co., Pittsburgh, Pa.  
Phoenix Meter Co., Prince Bay, St. Isl., N. Y.  
Thomson Meter Corp., New York  
Union Water Meter Co., Worcester, Mass.  
Worthington Pump & Mch. Corp., New York
- METERS, WATER (VENTURI TYPE)**  
Builders Iron Fdry., Providence, R. I.  
Simplex Valve & Meter Co., Philadelphia, Pa.
- MIXERS, CONCRETE (See Concrete Mixers)**
- MIXERS, GROUT**  
\*Lakewood Eng. Co., Cleveland, Ohio  
\*Union Iron Works, Inc., Hoboken, N. J.  
Kent Mach. Co., Cuyahoga Falls, Ohio  
T. L. Smith Co., Milwaukee, Wis.

If you find any errors or omissions in this Where to Purchase list, please send corrections to CONTRACTORS AND ENGINEERS MONTHLY

# Digs As It Loads

**No Poking Down the Bank**  
**No Shoveling into the Feeder**  
**No Labor except One Operator**



## The NELSON Q-7 LOADER

*on McCormick Tractor*

has unrivalled digging power, breaking out solid ground and loading it into the trucks in one operation.

Power properly applied through continuous spiral feeders roots out the earth or gravel smoothly and without excessive shock to the machinery, resulting in

**EASY OPERATION**  
**ECONOMY OF POWER**  
**LOW UPKEEP COSTS**  
**AND LONG LIFE**

**The N. P. NELSON IRON WORKS, Inc.**  
**822 Bloomfield Avenue**

::

**Passaic, N. J.**



# Where to Purchase

## MIXERS, MORTAR

\*Atlas Engineering Co., Clintonville, Wis.  
\*C. H. & A. Mfg. Co., Milwaukee, Wis.  
\*Haitzel St. Form & Br. Co., Warren, Ohio  
\*Jaeger Machine Co., Columbus, Ohio  
\*Lawrence Eng. Co., Cleveland, Ohio  
\*Lansing Co., Lansing, Mich.  
\*John Lauson Mfg. Co., New Holstein, Wis.  
\*Ransome Cons. Mch. Co., Dunellen, N. J.  
\*Anchor Mfg. Co., Chicago  
\*Archer Iron Works, Chicago  
\*Blystone Mfg. Co., Cambridge Spgs., Pa.  
\*Construction Machy. Co., Waterloo, Iowa  
\*Norris K. Davis, San Francisco, Calif.  
\*Kent Machine Co., Kent, Ohio  
\*Kiel Machine Co., Kiel, Wis.  
\*Knickerbocker Co., Jackson, Mich.  
\*Meili-Blumberg Co., New Holstein, Wis.  
\*T. L. Smith Co., Milwaukee, Wis.  
\*Standard Scale & Sup. Corp., Pittsburgh  
\*Talbot-Flood Mfg. Co., Kansas City, Mo.

## MIXERS, PLASTER

\*Atlas Engineering Co., Clintonville, Wis.  
\*Conveying Weigher Co., N. Y.  
\*Jaeger Machine Co., Columbus, Ohio  
\*John Lauson Mfg. Co., New Holstein, Wis.  
\*Anchor Mfg. Co., Chicago  
\*Blystone Mfg. Co., Cambridge Spgs., Pa.  
\*Construction Machy. Co., Waterloo, Iowa  
\*Norris K. Davis, San Francisco, Calif.  
\*Easick & Co., Los Angeles, Cal.  
\*Knickerbocker Co., Jackson, Mich.  
\*Meili-Blumberg Co., New Holstein, Wis.  
\*Standard Scale & Sup. Corp., Pittsburgh  
\*Talbot-Flood Mfg. Co., Kansas City, Mo.

## MORTAR BOXES

\*Blaw-Knox Co., Pittsburgh, Pa.  
\*General Wheelbarrow Co., Cleveland, Ohio  
\*Haitzel St. Form & Br. Co., Warren, Ohio  
\*Jos. Henhorst Co., Cincinnati, Ohio  
\*Anchor Mfg. Co., Chicago, Ill.  
\*Beatrice Steel Tank Mfg. Co., Beatrice, Neb.  
\*Canton Art Metal Co., Canton, Ohio  
\*Donley Bros. Co., Cleveland, O.  
\*Empire Metal Tank Wks., E. Rochester, N. Y.  
\*Norris K. Davis, San Francisco, Calif.  
\*Littleford Bros., Cincinnati

## MOTORCYCLES

\*Cleveland Motorcycle Co., Cleveland, Ohio  
\*Excelsior Motor Mfg. & Supply Co., Chicago  
\*Harley-Davidson Motor Co., Milwaukee  
\*Indian Motorcycle Co., Springfield, Mass.

## MOTORS, GASOLINE (See Engines, Gas and Gasoline)

## MOTOR TRUCKS

\*Dodge Bros., Detroit  
\*International Harvester Co., Chicago  
\*Acme Motor Truck Co., Oadilee, Mich.  
\*Amer.-La. France & Foamite Corp., New York  
\*Asterbury Motor Car Co., Buffalo, N. Y.  
\*Autocar Co., Ardmore, Pa.  
\*Brookway Motor Truck Co., Cortland, N. Y.  
\*Clydesdale Motor Truck Co., Clyde, Ohio  
\*Diamond T. Motor Car Co., Chicago  
\*Duplex Truck Co., Lansing, Mich.  
\*Federal Motor Truck Co., Detroit  
\*Ford Motor Co., Detroit  
\*Four Wheel Drive Auto Co., Clintonville, Wis.  
\*General Motors Truck Co., Chicago  
\*Gramm Motors, Inc., Lima, Ohio  
\*The Hug Co., Highland, Ill.  
\*Indiana Truck Corp., Marion, Ind.  
\*Larabee-Deyo Motor Tr. Co., Binghamton, N.Y.  
\*Leedinghaus-Hessenschied Wagon Co., St. Louis  
\*Mack Trucks, Inc., New York  
\*Pierce-Arrow Motor Car Co., Buffalo  
\*Reo Motor Car Co., Lansing, Mich.  
\*Standard Motor Truck Co., Detroit  
\*Sterling Motor Truck Co., Milwaukee  
\*Stewart Motor Corp., Buffalo, N. Y.  
\*Traffic Motor Tr. Co., St. Louis, Mo.  
\*Walter Motor Truck Co., L. I. City, N. Y.  
\*White Co., Cleveland, Ohio  
\*Yellow Truck & Coach Mfg. Co., Chicago

## MOULDS, CONCRETE

\*Blaw-Knox Co., Pittsburgh, Pa.  
\*Haitzel St. Form & Br. Co., Warren, Ohio

## MUCKING, MACHINES

Hear Shovel Co., Duluth, Minn.

## NUMBERS, HOUSE (See House Numbers) OILS, ROAD

\*Barber Asphalt Co., Philadelphia, Pa.  
\*Barrett Co., N. Y.  
\*Standard Oil Co. (Indiana), Chicago  
\*Standard Oil Co. (N. Y.), N. Y.  
\*Atl. Ref. & Asph. Corp., Philadelphia, Pa.

Headley Good Roads Co., Philadelphia, Pa.  
Pioneer Asph. Co., Lawrenceville, Ill.  
Standard Oil Co. (La.), N. Orleans, La.  
Standard Oil Co. (N. J.), Newark, N. J.  
Texas Company, N. Y.

## OXY-ACETYLENE APPARATUS

\*Oxweld Acetylene Co., Long Island City, N. Y.  
Alex. Milburn Co., Baltimore, Md.

## PACKING, WATER PIPE

The Leadite Co., Philadelphia, Pa.  
United Lead Company, N. Y.

## PAINTING MACHINERY

Binks Spray Equipment Co., Chicago  
Chicago Pneumatic Tool Co., New York  
De Vilbiss Mfg. Co., Toledo, Ohio  
Eclipse Air Brush Co., Newark, N. J.  
Hobart Brothers Co., Troy, Ohio  
W. N. Matthews Corp., St. Louis  
Alex. Milburn Co., Baltimore, Md.  
Pasche Air Brush Co., Chicago  
Simons Paint Spray Brush Co., Dayton, Ohio  
Sprace Painting Equip. Co., Boston

## PAINTS, METAL PROTECTION

\*Barber Asphalt Co., Philadelphia  
\*Barrett Co., New York  
\*Carry Co., Philip, Cincinnati  
\*Jos. Dixon Crucible Co., Jersey City, N. J.  
\*McWorick Inc., Los Angeles, Calif.  
\*Selway Sales Corp., New York  
Acme White Lead & Color Works, Detroit  
Berry Bros., Detroit  
Cook Paint & Varnish Co., Kansas City, Mo.  
Detroit Graphite Co., Detroit  
Detroit White Lead Works, Detroit  
E. I. De Pont de Nemours & Co., Inc., Wilmington, Del.  
Euclid Chemical Co., Cleveland, Ohio  
Hoesier Paint Works, Ft. Wayne, Ind.  
Minwax Co., N. Y.  
Protexol Corp., Kentworth, N. J.  
Ruberoid Co., N. Y.  
Serviced Products Corp., Chicago  
Sherwin-Williams Co., Cleveland, Ohio  
L. Sonneborn Sons, N. Y.  
Toth Brothers, N. Y.  
Tropical Paint & Oil Co., Cleveland, Ohio  
Truscon Laboratories, Detroit

## PARK BENCHES

Logan Co., Louisville, Ky.  
Fred J. Meyers Mfg. Co., Hamilton, Ohio  
Millersville Supply Co., Millersville, Pa.  
Stewart Iron Works Co., Cincinnati, Ohio  
Van Dorn Iron Works Co., Cleveland

## PAVEMENT BREAKERS (See Breakers)

## PAVERS, CONCRETE

\*Jaeger Mach. Co., Columbus, Ohio  
\*Koehring Co., Milwaukee  
\*Lakewood Eng. Co., Cleveland, Ohio  
\*Ransome Cons. Mch. Co., Dunellen, N. J.  
Chain Belt Co., Milwaukee  
Foots Co., Nunda, N. Y.  
T. L. Smith Co., Milwaukee

## PAVING AND ROAD ROLLERS (See Road and Paving Rollers)

## PAVING BLOCKS, CREOSOTED WOOD (See Creosoted Blocks)

## PAVING BRICK

Alton Brick Co., Alton, Ill.  
Backus Shale Brick Co., Cleveland, Ohio  
Buffalo Brick Co., Buffalo, N. Y.  
Cleveland Brick & Clay Co., Cleveland, Ohio  
Collinwood Shale Brick Co., Cleveland, Ohio  
Corry Brick & Tile Corp., Corry, Pa.  
Crescent Brick Co., Pittsburgh, Pa.  
Euclid Shale Brick Co., Cleveland, Ohio  
Georgia Vit. Brick Co., Augusta, Ga.  
Globe Brick Co., E. Liverpool, Ohio  
Hammond Fire Brick Co., Fairmount, W. Va.  
Hixylvania Coal Co., Columbus, Ohio  
Hocking Valley Brick Co., Columbus, Ohio  
McAvoy Brick Co., Bridgeville, Pa.  
Mayer Brick Co., Bridgeville, Pa.  
Metropolis Paving Brick Co., Pittsburgh, Pa.  
Metropolitan Paving Brick Co., Canton, Ohio  
Mineral Wells Brick Co., Mineral Wells, Tex.  
Moberly Paving Brick Co., Moberly, Mo.  
Murphysboro Paving Brick Co., Murphysboro, Ill.  
Nelson Brick Co., Nelsonville, Ohio  
Nelsonville Brick Co., Columbus, Ohio  
Patton Clay Mfg. Co., Patton, Pa.

Paxton Brick Co., Watertown, Pa.  
Peoples Paving Brick Co., Portsmouth, Ohio  
Peoria Brick & Tile Co., Peoria, Ill.  
Purinton Paving Brick Co., Galesburg, Ill.  
Rose Shale Brick Co., Veedersburg, Ill.  
Russell Clay Mfg. Co., Alton, Ala.  
So. Clay Mfg. Co., Chattanooga, Tenn.  
Springfield Paving Brick, Springfield, Ill.  
Sterling Brick Co., Olean, N. Y.  
Streator Clay Mfg. Co., Streator, Ill.  
Terra Haute Vit. Brick Co., Terra Haute, Ind.  
Thornton Fire Brick Co., Clarksburg, W. Va.  
Thurber Brick Co., Thurber, Tex.  
Toronto Fire Clay Co., Toronto, Ohio  
Trinidad Brick & Tile Co., Trinidad, Ohio  
United Clay Products Corp., Kansas City  
Western Shale Products Co., Ft. Scott, Kan.  
Westport Paving Brick Co., Westport, Md.

## PAVING MACHINERY (See Road and Paving Machinery)

## PAVING GUARDS, STEEL

W. S. Godwin Co., Baltimore, Md.

## PAVING MATERIALS (See "Asphalt," "Paving Brick," "Granite Block," etc.)

## PAVING MIXERS (See Concrete Mixers)

## PAVING TOOLS

\*Barber Asphalt Co., Philadelphia, Pa.  
\*Chausse Oil Burner Co., Elkhart, Ind.  
\*Connery & Co., Philadelphia, Pa.  
\*Jos. Henhorst Co., Cincinnati, Ohio  
\*Union Iron Works, Inc., Hoboken, N. J.  
\*Acroll Burner Co., West New York, N. J.  
\*W. H. Anderson Tool & Supply Co., Detroit  
\*F. D. Cummer & Sons Co., Cleveland, Ohio  
\*Hank Mfg. Co., Brooklyn, N. Y.  
\*Littleford Bros. Co., Cincinnati, Ohio  
\*Warren Bros. Co., Boston

## PICKS

Hubbard Co., Pittsburgh, Pa.  
Iron City Tool Works, Pittsburgh  
Klein-Logan Co., Pittsburgh  
Oliver Iron & Steel Corp., Pittsburgh, Pa.  
Verona Tool Works, Verona, Pa.  
Warren Tool & Forge Co., Warren, Ohio  
Warwood Tool Co., Wheeling, W. Va.  
Wyoming Shovel Works, Wyoming, Pa.

## PILE DRIVERS

\*Brown Clutch Co., Sandusky, Ohio  
\*Bucyrus-Erie Co., Erie, Pa.  
\*Clyde Iron Works Sales Co., Duluth, Minn.  
\*Industrial Brownhoist Corp., Cleveland  
\*McKiernan-Terry Drill Co., N. Y.  
\*Union Iron Works, Inc., Hoboken, N. J.  
\*Lidgerwood Mfg. Co., Elizabeth, N. J.  
\*McKyer Interstate Co., Cleveland, Ohio  
\*Mead-Morrison Mfg. Co., East Boston

## PILE-HAMMERS, STEAM

\*Clyde Iron Works Sales Co., Duluth, Minn.  
\*Industrial Brownhoist Corp., Cleveland  
\*McKiernan-Terry Drill Co., N. Y.  
\*Union Iron Works, Inc., Hoboken, N. J.  
\*Wemlinger, Inc., N. Y.  
\*National Hoisting Engine Co., Harrison, N. J.  
\*Vulcan Iron Works, Chicago

## PILING, CONCRETE

MacArthur Conc. Pile & P'd'n Co., N. Y.  
Raymond Concrete Pile Co., N. Y.

## PILING, INTERLOCKING STEEL

\*Wemlinger, Inc., New York  
Bethlehem Steel Co., Bethlehem, Pa.  
Carnegie Steel Co., Pittsburgh

## PILING, STEEL SHEET

\*Wemlinger, Inc., New York  
Bethlehem Steel Co., Bethlehem, Pa.

## PIPE, CAST IRON

\*Central Foundry Co., N. Y.  
\*U. S. Pipe & Foundry Co., Burlington, N. J.  
\*Am. Cast Iron Pipe Co., Birmingham, Ala.  
\*J. B. Clow & Sons, Chicago  
\*Donaldson Iron Co., Emsa, Pa.  
\*John Fox & Co., N. Y.  
\*Glamorgan Pipe & F'dry Co., Lynchburg, Va.  
\*Lynchburg F'dry Co., Lynchburg, Va.  
\*McWane Cast Iron Pipe Co., Birmingham, Ala.  
\*National Cast Iron Pipe Co., Birmingham, Ala.  
\*Warren Foundry & Pipe Co., N. Y.  
\*H. D. Wood & Co., Philadelphia, Pa.

## PIPE, CULVERT (See Culverts)

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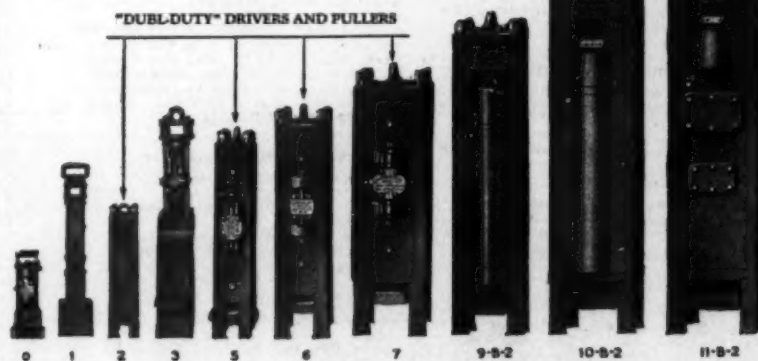
## DRIVING 7' 6" STEEL CYLINDERS



The picture shows a McKiernan-Terry Pile Hammer driving one of several steel cylinders used as caissons for building concrete piers. These cylinders were 7 ft. 6 in. in diameter, 105 ft. long, and were driven to exact grade. The pile hammer was McKiernan-Terry No. 11-B-2, which weighs 13,185 pounds and operates a 3,625-pound ram at 120 strokes per minute. . . . This is one of a hundred interesting job pictures in McKiernan-Terry Bulletin 37, which will be sent to you on request. Please address McKiernan-Terry Drill Company, 19 Park Row, New York.



### McKiernan-Terry Double-Acting Pile Hammers



## McKiernan-Terry PILE HAMMERS

# Where to Purchase

## PIPE, LEAD

United Lead Company, N. Y.

## PIPE, REINFORCED CONCRETE

\*Newark Concrete Pipe Co., Newark, N. J.  
Concrete Products Co., Pittsburgh, Pa.  
Core Joint Concrete Pipe Co., Baltimore  
Independent Concrete Pipe Co., Indianapolis  
Lock Joint Pipe Co., Ampere, N. J.

## PIPE, RIVETED STEEL OR IRON

\*Conners & Co., Inc., Philadelphia, Pa.  
\*Jos. Honherst Co., Cincinnati, O.  
Abendroth & Root Mfg. Co., Newburgh, N. Y.  
American Spiral Pipe Works, Chicago  
Biggs Boiler Works, Akron  
Canton Culvert & Silo Co., Canton, O.  
Chattanooga Boiler & Tank Co., Chatta., Tenn.  
Chicago Bridge & Iron Works, Chicago  
East Jersey Pipe Co., N. Y.  
Hammond Iron Works, Warren, Pa.  
R. Hardesty Mfg. Co., Denver  
Lancaster Iron Works, Lancaster, Pa.  
Littleford Bros., Cincinnati, O.  
Pittsburgh-Des Moines Steel Co., Pittsb'g, Pa.  
Tippett & Wood, Phillipsburg, N. J.  
Weller Mfg. Co., Chicago

## PIPE, STEEL

Central Tube Co., Pittsburgh, Pa.  
Jones & Laughlin Steel Co., Pittsburgh  
National Tube Co., Pittsburgh  
Republic Iron & Steel Co., Youngstown, O.  
South Chester Tube Co., Chester, Pa.  
Spang-Chalfont & Co., Pittsburgh, Pa.  
Wheeling Steel Corp., Wheeling, W. Va.  
Youngstown Sheet & Tube Co., Youngstown, O.

## PIPE, WOOD

American Wood Pipe Co., Tacoma, Wash.  
Federal Tank & Pipe Co., Seattle, Wash.  
Michigan Pipe Co., Bay City, Mich.  
Pacific Pipe & Tank Co., San Francisco  
Redwood Mfrs. Co., San Francisco  
Standard Wood Pipe Co., Williamsport, Pa.  
A. Wyckoff & Sons Co., Elmira, N. Y.

## PIPE, WROUGHT IRON

A. M. Byers Co., Pittsburgh, Pa.  
Cohoes Rolling Mill Co., Cohoes, N. Y.  
Reading Iron Co., Reading, Pa.

## PIPE BENDING MACHINES

American Pipe Bending Mach. Co., Boston  
Watson-Stillman Co., New York

## PIPE COVERING

### AIRCELL

\*Philip Carey Co., Cincinnati, Ohio  
Ehret Mag. Mfg. Co., Valley Forge, Pa.  
Johns-Manville, Inc., N. Y.  
Kearney & Mattison Co., Ambler, Pa.  
National Asbestos Co., Jersey City, N. J.  
Norristown Mag. & Asb. Co., Norristown, Pa.  
Hall Mountain Co., Chicago  
H. F. Watson Co., Erie, Pa.

### 85 PER CENT MAGNESIA

\*Philip Carey Co., Cincinnati, Ohio  
Ehret Mag. Mfg. Co., Valley Forge, Pa.  
Johns-Manville, Inc., N. Y.  
Kearney & Mattison Co., Ambler, Pa.  
Norristown Mag. & Asb. Co., Norristown, Pa.

### WOOD

Redwood Mfrs. Co., San Francisco  
A. Wyckoff & Son Co., Elmira, N. Y.

## PIPE CUTTERS (See Cutters, Pipe, Head)

## PIPE FITTINGS

\*Central Foundry Co., N. Y.  
\*U. S. Pipe & Foundry Co., Burlington, N. J.  
American Cast Iron Co., Birmingham, Ala.  
Builders Iron Foundry, Providence, R. I.  
J. B. Clow & Sons, Chicago  
Crane Co., Chicago  
Donaldson Iron Co., Emaus, Pa.  
Lunkenheimer Co., Cincinnati, O.  
Ntl. C. I. Pipe Co., Birmingham, Ala.  
Reading Steel Casting Co., Inc., Bridgeport, Conn.  
Warren Foundry & Pipe Co., N. Y.  
R. D. Wood & Co., Philadelphia, Pa.

## PIPE HANDLING MACHINERY

Taylor Portable Steel Derrick Co., Chicago

## PIPE TAPPING MACHINERY (See Water Main Tapping)

## PIPE JOINT COMPOUND (Sewer)

\*Philip Carey Co., Cincinnati, Ohio  
\*Jos. Dixon Crucible Co., Jersey City, N. J.

Atlas Mineral Prod. Co., Meristown, Pa.  
The Leadite Co., Philadelphia, Pa.  
Pacific Flash Tank Co., Chicago and N. Y.  
Ruberoid Co., New York  
Texas Co., New York  
Waring-Underwood Co., Philadelphia, Pa.

## PIPE JOINT MATERIAL (Cast Iron)

Hydraulic Development Co., Boston  
The Leadite Co., Philadelphia, Pa.  
United Lead Co., New York

## PIPE PUSHERS

\*Templeton, Kenly & Co., Chicago  
Duff Mfg. Co., Pittsburgh  
Easy Mfg. Co., Lincoln, Neb.  
Giant Mfg. Co., Council Bluffs, Ia.

## PIPE THREADERS

Armstrong Mfg. Co., Bridgeport, Conn.

## PLANERS, PNEUMATIC

Tousley Tool Co., Cleveland, Ohio

## PLAYGROUND APPARATUS

American Playground Device Co., Anderson, Ind.  
Chicago Gymnasium Equipment Co., Chicago  
Everwear Mfg. Co., Springfield, O.  
Giant Mfg. Co., Council Bluffs, Ia.  
Hill-Standard Co., Anderson, Ind.  
R. F. Lamar & Co., Pueblo, Colo.  
Fred. Medart Mfg. Co., St. Louis, Mo.  
Mitchell Mfg. Co., Milwaukee  
Patterson-Williams Co., San Jose, Calif.  
A. G. Spalding & Bros., Chicopee, Mass.

## PLOWS, CONTRACTORS'

\*Austin-Western Road Mach. Co., Chicago  
\*Caterpillar Trac. Co., San Leandro, Cal.  
\*General Wheelbarrow Co., Cleveland  
\*International Harvester Co., Chicago  
\*Roderick Lean Mfg. Co., Mansfield, O.  
J. D. Adams & Co., Indianapolis, Ind.  
American Steel Scraper Co., Sidney, O.  
Deere & Co., Moline, Ill.  
C. D. Edwards Mfg. Co., Albert Lea, Minn.  
Gallon Iron Works & Mfg. Co., Gallon, O.  
Moline Implement Co., Moline, Ill.  
Oliver Chilled Plow Works, South Bend, Ind.  
Sidney Steel Scraper Co., Sidney, O.  
Slusser-McLean Scraper Co., Sidney, O.  
Western Wheeled Scraper Co., Aurora, Ill.  
Wiard Plow Co., Batavia, N. Y.

## PLOWS, ROAD AND ROOTER

\*Austin-Western Road Machinery Co., Chicago  
\*Caterpillar Tractor Co., San Leandro, Calif.  
\*General Wheelbarrow Co., Cleveland  
Acme Road Machy. Co., Frankfort, N. Y.  
J. D. Adams & Co., Indianapolis  
American Steel Scraper Co., Sidney, Ohio  
Beach Mfg. Co., Charlotte, Mich.  
Ted Carr & Co., Chicago  
Deere & Co., Moline, Ill.  
C. D. Edwards Mfg. Co., Albert Lea, Minn.  
Gallon Iron Works & Mfg. Co., Gallon, Ohio  
P. B. Hackley Equip. Co., San Francisco  
Sidney Steel Scraper Co., Sidney, Ohio  
Slusser-McLean Scraper Co., Sidney, Ohio  
Western Wheeled Scraper Co., Aurora, Ill.  
Wiard Plow Co., Batavia, N. Y.

## PLUMBING SUPPLIES

J. B. Clow & Sons, Chicago  
Crane Co., Chicago  
Glauber Brass Mfg. Co., Cleveland, O.  
J. L. Mott Iron Works, N. Y.  
Mueller Company, Decatur, Ill.  
Rundle-Spence Mfg. Co., Milwaukee  
Walworth Mfg. Co., Boston

## PNEUMATIC CONCRETE PLACERS

\*Ransome Concrete Machinery Co., Dunellen, N. J.  
Cement-Gun Co., Inc., Allentown, Pa.

## PNEUMATIC GROUT MIXERS & PLACERS

\*Ransome Concrete Machinery Co., Dunellen, N. J.  
Cement-Gun Co., Inc., Allentown, Pa.

## PORTABLE BUILDINGS

\*Blaw-Knox Co., Pittsburgh, Pa.  
\*Truscon Steel Co., Youngstown, O.  
Littleford Bros., Cincinnati, O.

## PORTABLE STEEL DERRICKS (See Derricks, Steel Portable)

## PORTABLE WOOD WORKERS

\*American Saw Mill Machinery Co., Hackettstown, N. J.  
Jaeger Portable Power Corp., Detroit  
Jones Superior Machine Co., Chicago

## PORTLAND CEMENT (See Cement)

## POTS, ASPHALT AND TAR, POURING

\*Barber Asphalt Co., Philadelphia, Pa.  
Acme Road Machinery Co., Frankfort, N. Y.  
Beach Manufacturing Co., Charlotte, Mich.  
Littleford Bros., Cincinnati, Ohio  
Tarrent Mfg. Co., Saratoga Springs, N. Y.

## POWDER (See Explosives)

## POWER PLANTS, INDUSTRIAL

\*Continental Motors Corp., Muskegon, Mich.  
\*Hercules Motors Corp., Canton, O.  
\*Sanderson-Cyclone Drill Co., Orrville, O.  
\*Waukesha Motor Co., Waukesha, Wis.  
Alamo Engine Co., Hillsdale, Mich.  
Buda Co., Harvey, Ill.  
Climax Engine Co., Clinton, Iowa  
Hinkley Motors, Inc., Detroit  
Serval Mfg. Co., Evansville, Ind.  
Wisconsin Motor Co., Milwaukee, Wis.

## PULLING MACHINES

\*Beebe Bros., Inc., Seattle, Wash.  
\*Clyde Iron Works Sales Co., Duluth, Minn.  
John Waldron Corp., New Brunswick, N. J.

## PUMPS, AIR LIFT

\*Sullivan Machinery Co., Chicago  
American Steam Pump Co., Battle Creek, Mich.  
Chicago Pneumatic Tool Co., New York  
Indiana Air Pump Co., Indianapolis  
Ingersoll-Rand Co., New York

## PUMPS, CENTRIFUGAL

\*Allis-Chalmers Mfg. Co., Milwaukee  
\*C. H. & E. Mfg. Co., Milwaukee, Wis.  
\*Domestic Eng. & Pump Co., Shippensburg, Pa.  
\*Evinrude Motor Division, Milwaukee, Wis.  
\*Homelite Corp., Port Chester, N. Y.  
\*La Bour Co., Chicago Heights, Ill.  
\*Novo Engine Co., Lansing, Mich.  
\*Trench & Marine Pump Co., New York  
Aldrich Pump Co., Allentown, Pa.  
American Steam Pump Co., Battle Creek, Mich.  
American Well Works, Aurora, Ill.  
Aurora Pump & Mfg. Co., Aurora, Ill.  
Barnes Mfg. Co., Mansfield, O.  
Bethlehem Steel Co., Bethlehem, Pa.  
Buffalo Steam Pump Co., Buffalo, N. Y.  
A. S. Cameron Steam Pump Works, New York  
Chain Belt Co., Milwaukee  
Chicago Pump Co., Chicago  
Cook Motor Co., Delaware, O.  
Dayton-Dowd Co., Quincy, Ill.  
Dean Bros. Co., Indianapolis  
De Laval Steam Turbine Co., Trenton, N. J.  
Erie Pump & Engine Works, Medina, N. Y.  
Fairbanks, Morse & Co., Chicago  
General Electric Co., Schenectady  
Goulds Pumps, Inc., Seneca Falls, N. Y.  
Humphreys Mfg. Co., Mansfield, Ohio  
Indiana Air Pump Co., Indianapolis  
Ingersoll-Rand Co., New York  
Keystone Driller Co., Beaver Falls, Pa.  
LeCourtney Co., Newark, N. J.  
Manistee Iron Works, Manistee, Mich.  
Morris Machine Works, Baldwinville, N. Y.  
Rumsey Pump Co., Seneca Falls, N. Y.  
United Iron Works, Inc., Kansas City, Mo.  
Warren Steam Pump Co., Warren, Mass.  
Weinman Pump Mfg. Co., Columbus, O.  
Wheeler Condenser & Eng. Co., Carteret, N. J.  
Worthington Pump & Machinery Corp., N. Y.  
Yeomans Bros. Co., Chicago

## PUMPS, CONTRACTORS'

\*Allis-Chalmers Mfg. Co., Milwaukee  
\*Ralph B. Carter Co., New York  
\*C. H. & E. Mfg. Co., Milwaukee  
\*Domestic Eng. & Pump Co., Shippensburg, Pa.  
\*Evinrude Motor Division, Milwaukee, Wis.  
\*Homelite Corp., Port Chester, N. Y.  
\*Jaeger Machine Co., Columbus, Ohio  
\*La Bour Co., Chicago Heights, Ill.  
\*John Lausen Mfg. Co., New Holstein, Wis.  
\*Novo Engine Co., Lansing, Mich.  
\*Waukesha Motor Co., Waukesha, Wis.  
Aldrich Pump Co., Allentown, Pa.  
American Steam Pump Co., Battle Creek, Mich.  
American Well Works, Aurora, Ill.  
Aurora Pump & Mfg. Co., Aurora, Ill.  
Barnes Mfg. Co., Mansfield, Ohio  
Buda Co., Harvey, Ill.  
A. S. Cameron Steam Pump Works, New York  
Chain Belt Co., Milwaukee  
Construction Machinery Co., Waterloo, Iowa  
Dayton-Dowd Co., Quincy, Ill.  
Drum Co., Salem, O.  
Emerson Pump & Valve Co., Alexandria, Va.  
Erie Pump & Engine Works, Medina, N. Y.  
Fairbanks, Morse & Co., Chicago  
Goulds Pumps, Inc., Seneca Falls, New York  
Humphreys Mfg. Co., Mansfield, Ohio  
Ingersoll-Rand Co., New York  
Jaeger Portable Power Corp., Detroit

\* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.\*



# Does Three Things

# 3

*The Insley Mast Hoist is an all steel hoisting plant which does three separate jobs, namely:*

- 1** It hoists concrete with the bucket. It places it with chutes if chutes can be used to advantage.
- 2** It hoists brick, tile and other material with the material elevator.
- 3** It hoists reinforcing steel, form panels, shoring etc., with the Chicago boom.

... **T**hese three things must be done on every building job. Instead of doing each one with a separate piece of equipment, how much simpler and less expensive it is to do all three of them at the same time and with the same plant—an Insley Mast Hoist

And how much better it is to have this permanent steel equipment which can be used on job after job with little depreciation.

**INSLEY  
MANUFACTURING  
COMPANY**

Engineers and Manufacturers  
INDIANAPOLIS, IND.

*Division of National  
Equipment Corporation*

*Chicago  
Boom*

*Material Elevator  
for all  
Materials*

*Bucket for  
Concrete*

# INSLEY



Please mention the CONTRACTORS AND ENGINEERS MONTHLY—it helps.

# Where to Purchase

## PUMPS, CONTRACTORS, (Continued)

Kinney Mfg. Co., Boston  
 LeCourtney Co., Newark, N. J.  
 Morris Machine Works, Baldwinville, N. Y.  
 F. E. Myers & Bros. Co., Ashland, O.  
 Fulcrum Steam Pump Co., New York  
 Ramsey Pump Co., Seneca Falls, N. Y.  
 Standard Scale & Supply Corp., Pittsburgh  
 Trench & Marine Pump Co., New York  
 Van Noy Machine Works, Albany, N. Y.  
 Waldo Bros. & Bond Co., Boston, Mass.

## PUMPS, DEEP WELL

\*Domestic Eng. & Pump Co., Shippensburg, Pa.  
 \*Nove Engine Co., Lansing, Mich.  
 Aldrich Pump Co., Allentown, Pa.  
 American Steam Pump Co., Battle Creek, Mich.  
 American Well Works, Aurora, Ill.  
 Barnes Mfg. Co., Mansfield, O.  
 A. S. Cameron Steam Pump Works, New York  
 A. D. Cook, Inc., Lawrenceburg, Ind.  
 Dean Bros. Co., Indianapolis  
 Deming Co., Salem, O.  
 Goulds Pumps, Inc., Seneca Falls, N. Y.  
 Harris Air Pump Co., Indianapolis  
 Humphreys Mfg. Co., Mansfield, Ohio  
 Indiana Air Pump Co., Indianapolis  
 Ingersoll-Rand Co., New York  
 Keystone Driller Co., Beaver Falls, Pa.  
 Layne & Bowler, Inc., Memphis, Tenn.  
 A. Y. McDonald Mfg. Co., Dubuque, Iowa  
 Midwest Engineering Co., Indianapolis, Ind.  
 F. E. Myers & Bros. Co., Ashland, O.  
 Ramsey Pump Co., Seneca Falls, N. Y.  
 Trench & Marine Pump Co., New York  
 United Iron Works, Inc., Kansas City, Mo.  
 Weinman Pump Mfg. Co., Columbus, O.

## PUMPS, DIAPHRAGM

\*C. H. & E. Mfg. Co., Milwaukee  
 \*Ralph B. Carter Co., New York  
 \*Construction Machinery Co., Waterloo, Ia.  
 \*Domestic Eng. & Pump Co., Shippensburg, Pa.  
 \*Nove Engine Co., Lansing, Mich.  
 Aurora Pump & Mfg. Co., Aurora, Ill.  
 Barnes Mfg. Co., Mansfield, O.  
 Chain Belt Co., Milwaukee, Wis.  
 Deming Co., Salem, Ohio  
 Dorr Co., New York  
 Goulds Pumps, Inc., Seneca Falls, N. Y.  
 Humphreys Mfg. Co., Mansfield, Ohio  
 Trench & Marine Pump Co., New York  
 Waldo Bros. & Bond Co., Boston, Mass.  
 Witte Engine Works, Kansas City, Mo.

## PUMPS, DREDGING

Kilgore Machinery Corp., Baltimore, Md.  
 Erie Pump & Engine Wks., Medina, N. Y.  
 Morris Machine Works, Baldwinville, N. Y.  
 Trench & Marine Pump Co., New York

## PUMPS, GASOLINE AND OIL

B. F. Bowser & Co., Inc., Ft. Wayne, Ind.  
 Gilbert & Barker Mfg. Co., Springfield, Mass.  
 Ingersoll-Rand Co., New York  
 Kinney Mfg. Co., Boston  
 Tekheim Oil Tank & Pump Co., Ft. Wayne, Ind.  
 Wayne Tank & Pump Co., Ft. Wayne, Ind.

## PUMPS, PORTABLE

\*C. H. & E. Mfg. Co., Milwaukee, Wis.  
 \*Evinrude Motor Division, Milwaukee, Wis.  
 \*Homelite Corp., Fort Chester, N. Y.  
 \*Jaeger Machine Co., Columbus, O.  
 \*John Lauson Mfg. Co., New Holstein, Wis.  
 American Steam Pump Co., Battle Creek, Mich.  
 Humphreys Mfg. Co., Mansfield, Ohio  
 Jaeger Portable Power Corp., Detroit  
 Trench & Marine Pump Co., New York

## PUMPS, POWER

\*Allis-Chalmers Mfg. Co., Milwaukee  
 \*C. H. & E. Mfg. Co., Milwaukee, Wis.  
 \*Domestic Eng. & Pump Co., Shippensburg, Pa.  
 \*Homelite Corp., Fort Chester, N. Y.  
 \*Nove Engine Co., Lansing, Mich.  
 \*Trench & Marine Pump Co., New York  
 \*Waukesha Motor Co., Waukesha, Wis.  
 Alamo Iron Works, San Antonio, Texas  
 Aldrich Pump Co., Allentown, Pa.  
 American Steam Pump Co., Battle Creek, Mich.  
 American Well Works, Aurora, Ill.  
 Aurora Pump & Mfg. Co., Aurora, Ill.  
 Barnes Mfg. Co., Mansfield, O.  
 Chicago Pump Co., Chicago  
 Dayton, Dowd Co., Quincy, Ill.  
 De Laval Steam Turbine Co., Trenton, N. J.  
 Deming Co., Salem, O.  
 Evinrude Motor Co., Milwaukee  
 Fairbanks, Morse & Co., Chicago  
 Gardner-Whitcomb Co., Quincy, Ill.  
 Goulds Pumps, Inc., Seneca Falls, N. Y.  
 Humphreys Mfg. Co., Mansfield, Ohio  
 Indiana Air Pump Co., Indianapolis  
 Ingersoll-Rand Co., New York  
 Kinney Mfg. Co., Boston  
 Lawrence Machinery Co., Lawrence, Mass.  
 LeCourtney Co., Newark, N. J.

## F. E. Myers & Bro. Co., Ashland, O.

Northern Fire Apparatus Co., Minneapolis  
 Ramsey Pump Co., Seneca Falls, N. Y.  
 Weinman Pump Mfg. Co., Columbus, O.  
 Worthington Pump & Machinery Corp., N. Y.  
 Yeomans Bros. Co., Chicago

## PUMPS, SEWAGE

\*C. H. & E. Mfg. Co., Milwaukee, Wis.  
 \*La Bour Co., Chicago Heights, Ill.  
 American Steam Pump Co., Battle Creek, Mich.  
 American Well Works, Aurora, Ill.  
 Barnes Mfg. Co., Mansfield, O.  
 A. S. Cameron Steam Pump Works, New York  
 Chicago Pump Co., Chicago  
 Fairbanks, Morse & Co., Chicago  
 Humphreys Mfg. Co., Mansfield, Ohio  
 Ingersoll-Rand Co., New York  
 Pacific Finish Tank Co., Chicago and N. Y.  
 Warren Steam Pump Co., Warren, Mass.  
 Yeomans Bros. Co., Chicago

## PUMPS, TAR AND ASPHALT

\*Barber Asphalt Co., Philadelphia  
 Kinney Mfg. Co., Boston

## PUNCHES AND DIES, STEEL

\*Cleveland Steel Tool Co., Cleveland, O.

## RADIATORS FOR GASOLINE ENGINES

McCord Radiator Mfg. Co., Detroit  
 Modine Mfg. Co., Racine, Wis.  
 Racine Radiator Co., Racine, Wis.  
 Young Radiator Co., Racine, Wis.

## RAIL AND RAIL JOINTS

Bethlehem Steel Co., Bethlehem, Pa.  
 Carnegie Steel Co., Pittsburgh, Pa.  
 Easton Car & Construction Co., Easton, Pa.  
 Koppel Ind. Car & Equipment Co., Koppel, Pa.  
 Sweet's Steel Co., Williamsport, Pa.  
 W. A. Zelnick Supply Co., St. Louis, Mo.

## RAILROAD DITCHERS (See Excavators, Ditch and Trench)

## REINFORCING CONCRETE (See Concrete Reinforcement)

## RIVETERS, PNEUMATIC

\*The Buhl Company, Chicago  
 \*Independent Pne. Tool Co., Chicago  
 Alliance Machine Co., Alliance, O.  
 Chicago Pneumatic Tool Co., New York  
 Cleveland Pneumatic Tool Co., Cleveland, O.  
 Hanna Engineering Works, Chicago  
 Halwig Mfg. Co., St. Paul, Minn.  
 Ingersoll-Rand Co., New York  
 Wm. H. Keller, Inc., Grand Haven, Mich.  
 Southwark Foundry & Machine Co., Phila.  
 Watson-Stillman Co., New York

## RIVET SETS

\*Cleveland Steel Tool Co., Cleveland, O.  
 \*Independent Pne. Tool Co., Chicago  
 Chicago Pneumatic Tool Co., New York  
 Cleveland Pneumatic Tool Co., Cleveland, O.  
 Dunbar Drop Forge Co., Chicago  
 Ingersoll-Rand Co., New York

## ROAD GRADERS, HORSE OR TRACTOR DRAWN

\*Austin-Western Road Mch. Co., Chicago  
 \*Baker Mfg. Co., Springfield, Ill.  
 \*Caterpillar Tractor Co., San Leandro, Cal.  
 \*Good Roads Machinery Co., Kennett Sq., Pa.  
 \*Kilbatter Mfg. Co., Los Angeles  
 \*W. A. Riddell Co., Bucyrus, O.  
 \*Gustav Schaefer Co., Cleveland  
 Acme Road Machy. Co., Frankfort, N. Y.  
 J. D. Adams & Co., Indianapolis, Ind.  
 Austin Mfg. Co., Chicago  
 Banting Mfg. Co., Toledo, O.  
 Beach Mfg. Co., Charlotte, Mich.  
 C. D. Edwards Mfg. Co., Albert Lea, Minn.  
 Gallion Iron Works & Mfg. Co., Gallion, O.  
 Gilbert Mfg. Co., Aberdeen, S. D.  
 Klauer Mfg. Co., Dubuque, Iowa  
 Little Red Wagon Mfg. Co., Omaha  
 Lytle Culvert & Road Equipment Co., Minneapolis  
 N. S. Monroe & Sons, Arthur, Ill.  
 New England Road Machy. Co., So. Boston, Mass.  
 Owensboro Ditcher & Grader Co., Owensboro, Ky.  
 Rome Mfg. Co., Rome, N. Y.  
 Ryan Mfg. Co., Chicago  
 Spears-Wells Machinery Co., Oakland, Cal.  
 Stockland Road Machinery Co., Minneapolis  
 Western Wheeled Scraper Co., Aurora, Ill.

## ROAD GRADERS, POWER

\*Austin-Western Road Machy. Co., Chicago  
 \*Caterpillar Tractor Co., San Leandro, Cal.  
 \*Good Roads Machinery Co., Kennett Sq., Pa.  
 \*W. A. Riddell Co., Bucyrus, O.  
 Acme Road Machinery Co., Frankfort, N. Y.  
 J. D. Adams & Co., Indianapolis  
 Beach Mfg. Co., Charlotte, Mich.  
 Gallion Iron Works & Mfg. Co., Gallion, O.  
 Gilbert Mfg. Co., Aberdeen, S. D.  
 Landreth Machinery Co., Joplin, Mo.  
 Little Red Wagon Mfg. Co., Omaha  
 Rome Mfg. Co., Rome, N. Y.  
 Spears-Wells Machinery Co., Oakland, Cal.  
 Wehr Co., Milwaukee

## ROAD MAINTAINERS, POWER

\*Caterpillar Tractor Co., San Leandro, Cal.  
 \*Good Roads Machinery Co., Kennett Sq., Pa.  
 C. D. Edwards Mfg. Co., Albert Lea, Minn.  
 Gallion Iron Works & Mfg. Co., Gallion, Ohio  
 Landreth Machinery Co., Joplin, Mo.  
 Rome Mfg. Co., Rome, N. Y.  
 Spears-Wells Machinery Co., Oakland, Cal.  
 Stockland Road Machinery Co., Minneapolis

## ROAD OILS (See Oils, Road)

## ROAD OILERS

\*Austin-Western Road Machy. Co., Chicago  
 \*Good Roads Machy. Co., Kennett Sq., Pa.  
 E. D. Enyrs & Co., Oregon, Ill.  
 Kinney Mfg. Co., Boston  
 Mack Trucks, Inc., New York  
 Municipal Supply Co., South Bend, Ind.  
 Spears-Wells Machinery Co., Oakland, Cal.  
 White Co., Cleveland

## ROCK CRUSHERS AND PULVERIZERS (See Crushers)

## ROCK DRILLS (See Drills, Rock)

## ROLLERS, EMBANKMENT

Acme Road Machy. Co., Frankfort, N. Y.  
 Beach Mfg. Co., Charlotte, Mich.  
 H. W. Rohl & Co., Los Angeles, Calif.

## ROLLERS, ROAD AND PAVING

\*Austin-Western Road Mch. Co., Chicago  
 \*Barber Asphalt Co., Philadelphia  
 \*Buffalo-Springfield Roller Co., Springfield, O.  
 \*Good Roads Machinery Co., Kennett Sq., Pa.  
 \*Huber Mfg. Co., Marion, Ohio  
 \*W. A. Riddell Co., Bucyrus, Ohio  
 Acme Road Machinery Co., Frankfort, N. Y.  
 Ames Iron Works, Oswego, N. Y.  
 Austin Mfg. Co., Chicago  
 Banting Mfg. Co., Toledo, O.  
 Beach Mfg. Co., Charlotte, Mich.  
 J. I. Case Threshing Mach. Co., Racine, Wis.  
 Erie Machine Shops, Erie, Pa.  
 Gallion Iron Works & Mfg. Co., Gallion, O.  
 Horst & Stricker Co., Davenport, Iowa  
 Kinney Standards, Inc., Brooklyn, N. Y.  
 Wehr Co., Milwaukee

## ROOFING, ASBESTOS, ASPHALT, COMPOSITION, TILE, ETC.

\*Barber Asphalt Co., Philadelphia  
 \*Barrett Co., New York  
 \*Phillip Carey Co., Cincinnati, O.  
 \*Standard Oil Co. (Indiana), Chicago  
 American Cement Tile Mfg. Co., Pittsburgh  
 Atlantic Refining & Asphalt Corp., Phila., Pa.  
 Beaver Products Co., Inc., Buffalo, N. Y.  
 Bird & Son, Inc., East Walpole, Mass.  
 Certain-teed Products Corp., New York  
 Chatfield Mfg. Co., Cincinnati, O.  
 Decatur Roofing & Corning Co., Albany, Ala.  
 Edwards Mfg. Co., Cincinnati, O.  
 Euclid Chemical Co., Cleveland  
 Flintkote Co., Boston  
 Johns-Manville, Inc., New York  
 Keystone Roofing Mfg. Co., York, Pa.  
 The Lehon Co., Chicago  
 F. J. Lewis Mfg. Co., Chicago  
 National Roofing Co., Tonawanda, N. Y.  
 National Sheet Metal Roofing Co., Jersey City, N. J.  
 W. F. Norman Sheet Metal Mfg. Co., Nevada, Mo.  
 Rnberold Co., New York  
 Sall Mountain Co., Chicago  
 Sifo Products Co., St. Paul, Minn.  
 L. Sonneborn & Sons, Inc., New York  
 Texas Co., New York  
 Western Elastite Roofing Co., Denver

## ROOFING KETTLES (See Kettles)

\* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.\*



*Did you read that article on page 40 July 17th. issue of Pit and Quarry "Temporary crushed Stone plant. supplements in a road construction job." Here's a piece of it.*

*...their vacations visiting Fort Ticonderoga, New Lake Cham- in this beautiful country. The job was too far removed from any area of sufficient population density or industrial activity to be within the serv- ice range of commercial producers of crushed stone. Consequently—as has become more and more customary in the extension of first-class roads through sparsely settled regions—it was necessary for the contractor to operate a crushed-stone plant of his own, as a sort of side issue. In this case not even electrical power was available. This contracting firm, J. W. was fortunate in locat-*

Road Contractors quite often face a similar problem to that referred to by the above article, and in such cases a Portable Rock Crushing Plant will effect a great saving in time and labor.



TO MEET PRESENT SPECIFICATIONS, FOR STONE 1 1/4" AND UNDER IN SUFFICIENT CAPACITY, INVESTIGATE



**CHAMPION**  
Roller Bearing  
REDUCTION CRUSHERS

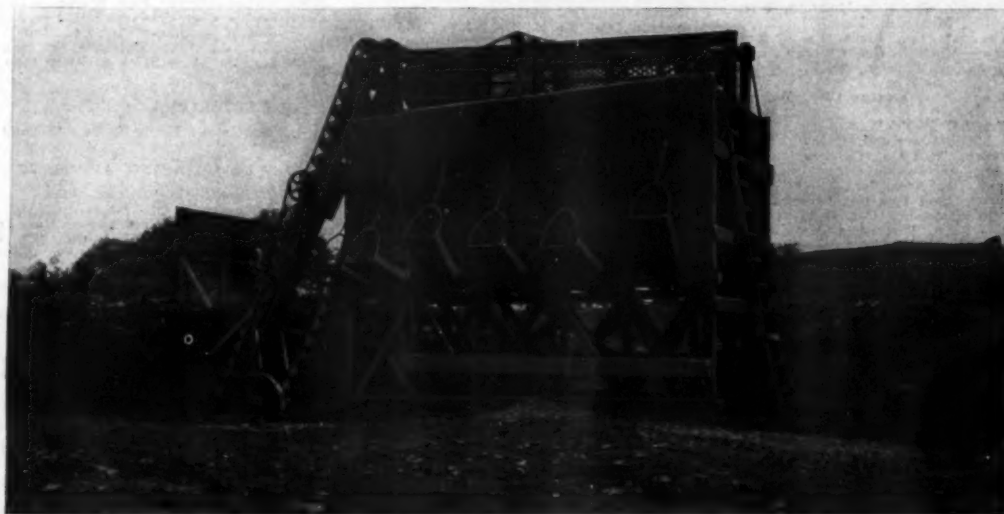
on Portable Mountings with Folding Type Bucket Elevators, complete.

CRUSHER SIZES AND CAPACITIES			
No.	Opening	Appx. Cap.	Jaws set to
1020	10" x 20"	3/4" T.P.H. 10	1 1/2" T.P.H. 20
1030	10" x 28 1/2"	3/4" T.P.H. 15	1 1/2" T.P.H. 30
1040	10" x 40"	3/4" T.P.H. 20	1 1/2" T.P.H. 45

ALEMITE LUBRICATION FITTINGS

The Storage Bins (in various capacity) with Screens mounted thereon, forms the second portable unit and completes the plant.

**SKF** SELF-ALIGNING  
ROLLER BEARINGS



## THE GOOD ROADS MACHINERY CO.

INCORPORATED

"A business established and in continuous operation for fifty-one years at Kennett Square—in Pennsylvania."

Branches

Philadelphia

Pittsburgh

Watertown, Mass.

New York

Chicago



# Where to Purchase

## ROPE, MANILA

American Mfg. Co., Brooklyn, N. Y.  
Columbian Rope Co., Auburn, N. Y.  
Cupples Cordage Co., Brooklyn, N. Y.  
Hoover & Allison Co., Xenia, O.  
R. A. Kelly Co., Xenia, O.  
N. Bedford Cordage Co., N. Bedford, Mass.  
Peoria Cordage Co., Peoria, Ill.  
Plymouth Cordage Co., N. Plymouth, Mass.  
Portland Cordage Co., Portland, Ore.  
St. Louis Cordage Mills, St. Louis, Mo.  
Tubbs Cordage Co., San Francisco  
Wall Rope Works, New York  
Waterbury Co., New York  
Whitlock Cordage Co., New York

## ROPE, WIRE, HOISTING, HAULAGE

\*American Steel & Wire Co., Chicago  
\*L. F. Green, Chicago  
\*Williamsport Wire Rope Co., Williamsport, Pa.  
American Cable Co., Inc., New York  
Broderick & Bascom Rope Co., St. Louis, Mo.  
Fischer & Hayes Rope & Steel Co., Chicago  
Hazard Wire Rope Co., Wilkesbarre, Pa.  
A. Leachen & Sons Rope Co., St. Louis  
Macwhysie Co., Kenosha, Wis.  
J. A. Roehling's Sons Co., Trenton, N. J.  
Upson-Walton Co., Cleveland, Ohio  
Wickwire Spencer Steel Co., New York

## RUBBER TIRES (See Tires)

## SALAMANDERS, OIL BURNING

Aerol Burner Co., West New York, N. J.  
Hauck Mfg. Co., Brooklyn, N. Y.  
Littleford Brothers, Cincinnati, Ohio

## SALAMANDERS, COKE OR WOOD BURNING

\*General Wheelbarrow Co., Cleveland, Ohio  
\*Joseph Hornbostel Co., Cincinnati, Ohio  
Jackson Mfg. Co., Harrisburg  
Littleford Brothers, Cincinnati, Ohio

## SAFETY TREADS (See Treads, Safety)

## RASH ROLLER STEEL (See Window Frames and Sash)

## SAW HORSES

\*Cleveland Steel Specialty Corp., Cleveland, O.  
Everhot Mfg. Co., Maywood, Ill.

## SAW MILLS & ACCESSORIES

\*American Saw Mill Machy. Co., Hackettstown, N. J.

## SAW RIGS, PORTABLE

\*American Saw Mill Machy. Co., Hackettstown, N. J.  
\*O. H. & E. Mfg. Co., Milwaukee  
\*John Laussen Mfg. Co., New Holstein, Wis.  
Beach Mfg. Co., Montrose, Pa.  
De Walt Products Co., Leola, Pa.  
Jones Superior Machine Co., Chicago  
Knickerbocker Co., Jackson, Mich.  
Leach Co., Oshkosh, Wis.  
Witte Engine Works, Kansas City, Mo.

## SAWS, PORTABLE POWER

\*Tenzley Tool Co., Cleveland, Ohio  
Electric-Magneto Tool Co., Chicago  
Flexway Corp., Cincinnati, Ohio  
Ingersoll-Rand Co., New York  
Michel Electric Hand Saw Co., Chicago  
Porter Cable Machinery Co., Syracuse  
Reed-Prattice Corp., Worcester, Mass.  
F. L. Rogers & Co., Chicago  
Skilaw, Inc., Chicago, Ill.  
Wappat Gear Works, Pittsburgh, Pa.  
Witte Engine Works, Kansas City, Mo.

## SCRAPERS

\*Austin-Western Road Machinery Co., Chicago  
\*Barber Asphalt Co., Philadelphia  
\*Buffalo-Springfield Roller Co., Springfield, O.  
\*Caterpillar Tractor Co., San Leandro, Cal.  
\*Good Roads Machy. Co., Kennett Sq., Pa.  
\*Huber Mfg. Co., Marion, Ohio  
\*Killefer Mfg. Corp., Los Angeles  
Acme Road Machinery Co., Frankfort, N. Y.  
Austin Mfg. Co., Chicago  
Banting Mfg. Co., Toledo, Ohio  
C. D. Edwards Mfg. Co., Albert Lea, Minn.  
Gallion Iron Works & Mfg. Co., Gallion, O.  
Klauser Mfg. Co., Dubuque, Iowa  
Rome Mfg. Co., Rome, N. Y.  
Universal Road Machy. Co., Kingston, N. Y.

## SCRAPERS, TIEH FOR

\*Caterpillar Tractor Co., San Leandro, Cal.  
Gallion Iron Works & Mfg. Co., Gallion, Ohio  
Shunk Mfg. Co., Bucyrus, Ohio

## SCOOPS, HORSE OR TRACTOR DRAWN (See Scrapers Drag, Scrapers, Rotary and Scrapers, Wheeled)

## SCOOPS, HAND (See Shovels, Spades and Scoops)

## SCOOPS, SKIMMER AND TRENCH

\*Bay City Shovels, Inc., Bay City, Mich.  
Keystone Driller Co., Beaver Falls, Pa.

## SCRAPERS, DRAG

\*Austin-Western Road Machinery Co., Chicago  
\*Caterpillar Tractor Co., San Leandro, Calif.  
Acme Road Machy. Co., Frankfort, N. Y.  
J. D. Adams & Co., Indianapolis, Ind.  
American Steel Scraper Co., Sidney, Ohio  
Beach Mfg. Co., Charlotte, Mich.  
Case Crane & Engg. Co., Columbus, Ohio  
Chattanooga Whlbrw Co., Chattanooga, Tenn.  
Deere & Co., Moline, Ill.  
Donaldson Bros., Mt. Clemens, Mich.  
C. D. Edwards Mfg. Co., Albert Lea, Minn.  
Gallion Iron Works & Mfg. Co., Gallion, Ohio  
Jackson Mfg. Co., Harrisburg, Pa.  
Sidney Steel Scraper Co., Sidney, Ohio  
Slusser-McLean Scraper Co., Sidney, Ohio  
Stockland Road Machinery Co., Minneapolis  
Toledo Wheelbarrow Co., Toledo, Ohio  
Western Wheeled Scraper Co., Aurora, Ill.

## SCRAPERS, FRESNO (See Scrapers, Rotary)

## SCRAPERS, DRAGLINE

\*General Wheelbarrow Co., Cleveland  
\*Sauerman Bros., Chicago  
Beach Mfg. Co., Charlotte, Mich.  
Garst Mfg. Company, Chicago  
Link-Belt Co., Chicago

## SCRAPERS, POWER DRAG

\*Beaumont Manufacturing Co., Philadelphia  
\*General Wheelbarrow Co., Cleveland  
\*L. F. Green, Chicago  
\*W. A. Riddell Co., Bucyrus, Ohio  
\*Sauerman Bros., Chicago  
\*Schofield-Burkett Constr. Co., Macon, Ga.  
Beach Mfg. Co., Charlotte, Mich.  
Garst Mfg. Company, Chicago

## SCRAPERS, ROAD (See also Drags, Road)

Rome Mfg. Co., Rome, N. Y.  
Root Spring Scraper Co., Kalamazoo, Mich.

## SCRAPERS, ROTARY

\*Austin-Western Road Machinery Co., Chicago  
\*Baker Mfg. Co., Springfield, Ill.  
\*Caterpillar Tractor Co., San Leandro, Calif.  
\*Euclid Crane & Hoist Co., Euclid Village, O.  
\*Killefer Mfg. Co., Los Angeles, Calif.  
\*Killefer Leach Co., Mansfield, Ohio  
\*Gustav Schaefer Co., Cleveland, Ohio  
Adams & Co., J. D., Indianapolis, Ind.  
American Steel Scraper Co., Sidney, Ohio  
Atlas Scraper Co., Los Angeles, Calif.  
Beach Mfg. Co., Charlotte, Mich.  
Case Crane & Engg. Co., Columbus, Ohio  
C. D. Edwards Mfg. Co., Albert Lea, Minn.  
Gallion Iron Works & Mfg. Co., Gallion, O.  
H. C. Shaw Co., Stockton, Calif.  
Sidney Steel Scraper Co., Sidney, Ohio  
Slusser-McLean Scraper Co., Sidney, Ohio  
Solano Iron Works, Berkeley, Calif.  
Stockland Road Machy. Co., Minneapolis, Minn.  
General Wheelbarrow Co., Cleveland, Ohio  
Lyle Culvert & Road Equip. Co., Minneapolis  
Miskin Scraper Works, Ucon, Idaho  
Root Spring Scraper Co., Kalamazoo  
Sidney Steel Scraper Co., Sidney, O.  
Stockland Road Machinery Co., Minneapolis  
Western Wheeled Scraper Co., Aurora, Ill.

## SCRAPERS, SELF-LOADING (See Scrapers, Rotary and Scrapers, Wheeled)

## SCRAPERS, WHEELED

\*Austin-Western Road Machinery Co., Chicago  
\*Baker Mfg. Co., Springfield, Ill.  
\*Caterpillar Tractor Co., San Leandro, Calif.  
\*Euclid Crane & Hoist Co., Euclid Village, O.  
\*General Wheelbarrow Co., Cleveland  
\*W. A. Riddell Co., Bucyrus, Ohio  
Acme Road Machy. Co., Frankfort, N. Y.  
J. D. Adams & Co., Indianapolis, Ind.  
American Steel Scraper Co., Sidney, Ohio  
Atlas Scraper Co., Los Angeles, Calif.  
Beach Mfg. Co., Charlotte, Mich.  
Case Crane & Engg. Co., Columbus, Ohio  
C. D. Edwards Mfg. Co., Albert Lea, Minn.  
Gallion Iron Works & Mfg. Co., Gallion, Ohio  
LaPlant-Chasto Mfg. Co., Cedar Rapids, Iowa  
Miami Trailer Scraper Co., Troy, Ohio  
Miskin Scraper Wks., Ucon, Ia.  
Sidney Steel Scraper Co., Sidney, Ohio  
Slusser-McLean Scraper Co., Sidney, Ohio  
H. C. Shaw Co., Stockton, Calif.  
Stockland Road Machy. Co., Minneapolis, Minn.  
Western Wheeler Scraper Co., Aurora, Ill.

## SCREENS, SAND, GRAVEL AND COAL

\*Allis-Chalmers Mfg. Co., Milwaukee  
\*Austin-Western Road Machinery Co., Chicago  
\*Chicago Automatic Conv. Co., Chicago  
\*Good Roads Machinery Co., Kennett Sq., Pa.  
\*L. F. Green, Chicago  
\*Geo. Haines Mfg. Co., New York  
Acme Road Machinery Co., Frankfort, N. Y.  
Atlas Engineering Co., Milwaukee, Wis.  
Austin Mfg. Co., Chicago  
C. O. Bartlett & Snow Co., Cleveland, Ohio  
Beach Mfg. Co., Charlotte, Mich.  
Brown Hoisting Machy. Co., Cleveland, Ohio

Chain Belt Co., Milwaukee, Wis.  
Deister Concentrator Co., St. Wayne, Ind.  
Gallion Iron Works & Mfg. Co., Gallion, Ohio  
Gifford-Wood Co., Hudson, N. Y.  
Hendrick Mfg. Co., Carbondale, Ohio  
Jeffrey Mfg. Co., Columbus, Ohio  
Link-Belt Co., Chicago  
Littleford Bros., Cincinnati, Ohio  
Lyle Culvert & Road Equipment Co., Minneapolis, Minn.  
Morrow Mfg. Co., Wellston, Ohio  
Newago Engineering Co., Newago, Mich.  
New Holland Machy. Co., New Holland, Pa.  
New Jersey Wire Cloth Co., Trenton, N. J.  
Robins Conv. Belt Co., New York  
H. B. Sackett Screen & Chute Co., Chicago  
Smith Engineering Works, Milwaukee, Wis.  
Universal Crusher Co., Cedar Rapids, Iowa  
Universal Road Machine Co., Kingston, N. Y.  
Webster Mfg. Co., Chicago  
Weller Mfg. Co., Chicago  
Wickwire Spencer Steel Co., New York

## SCREENS, SEWAGE

Dorr Co., New York  
Green Bay Fdry. & Mach. Wks., Green Bay, Wis.  
Link-Belt Co., Chicago  
Simplex Ejector & Aerator Corp., Chicago

## SEWAGE DISINFECTION

\*Wallace & Tiernan Co., Inc., Newark, N. J.  
Paradon Mfg. Co., Arlington, N. J.

## SEWAGE DISPOSAL APPARATUS

Dorr Co., New York  
Link-Belt Co., Chicago  
Pacific Flush Tank Co., Chicago and N. Y.  
Simplex Ejector & Aerator Corp., Chicago

## SEWAGE EJECTORS

Pacific Flush Tank Co., Chicago and N. Y.  
Simplex Ejector & Aerator Corp., Chicago  
Yeomans Bros. Co., Chicago

## SEWAGE PUMPS (See Pumps)

## SEWER BLOCKS, SEGMENT

American Vit. Products Co., Akron, Ohio  
Cannelton Sewer Pipe Co., Cannelton, Ind.  
Denver Sewer Pipe & Clay Co., Denver, Colo.  
W. S. Dickey Clay Mfg. Co., Kansas City, Mo.  
Evans & Howard Fire Brick Co., St. Louis, Mo.  
Laclede Christy Clay Prod. Co., St. Louis, Mo.  
Macomb Sewer Pipe Works, Macomb, Ill.  
Pacific Clay Products Co., Los Angeles, Cal.  
Red Wing Sewer Pipe Co., Red Wing, Minn.  
Robinson Clay Products Co., Akron, Ohio  
Standard Fire Brick & Sewer Pipe Co., Pueblo, Col.

## SEWER BRACES

\*Templeton, Kenly & Co., Chicago

## SEWER CLEANING APPARATUS

F. Bissell Co., Toledo, Ohio  
Champion Corp., Hammond, Ind.  
Hepco Sewer Root Cutter Co., Freeport, Ill.  
Self Propelling Nozzle Co., New York  
Turbine Sewer Machine Co., Milwaukee

## SEWER PIPE AND DRAIN TILE

American Vit. Products Co., Akron, Ohio  
Blackmer & Post Pipe Co., St. Louis  
William E. Dee Co., Chicago  
Denver Sewer Pipe & Clay Co., Denver, Colo.  
W. S. Dickey Clay Mfg. Co., Kansas City, Mo.  
Evans & Howard Fire Brick Co., St. Louis  
Logan Clay Products Co., Logan, Ohio  
Ohio Vit. Pipe Co., Uhrichsville, Ohio  
Patton Clay Mfg. Co., Patton, Pa.  
Red Wing Sewer Pipe Co., Red Wing, Minn.  
Robinson Clay Prod. Co., Akron, Ohio  
Streator Clay Mfg. Co., Streator, Ill.

## SEWER PIPE FORMS (See Forms, Concrete Pipe)

## SEWER PIPE JOINT COMPOUNDS

Atlas Mineral Prod. Co., Mertztown, Pa.  
Pacific Flush Tank Co., Chicago and N. Y.  
Ruberoil Co., New York  
Servisised Products Corp., Chicago  
Cone Form Co., Inc., Syracuse, N. Y.  
Quinn Wire & Iron Works, Boone, Iowa

## SEWER RODS

F. Bissell Co., Toledo, Ohio  
Champion Corp., Hammond, Ind.  
Turbine Sewer Machine Co., Milwaukee

# WILLIAMSPORT WIRE ROPE

Make your purchase,  
as well as use,

## SAFE!

It's a very simple matter to get the wrong grade of Wire Rope on a job; easy for you to order "Plow Steel" and get "Crucible Cast" by mistake.

That's why we have put into the hemp core the Telfax Tape upon which is printed the grade of steel from which the wire rope is made; and our name as a guarantee of quality.

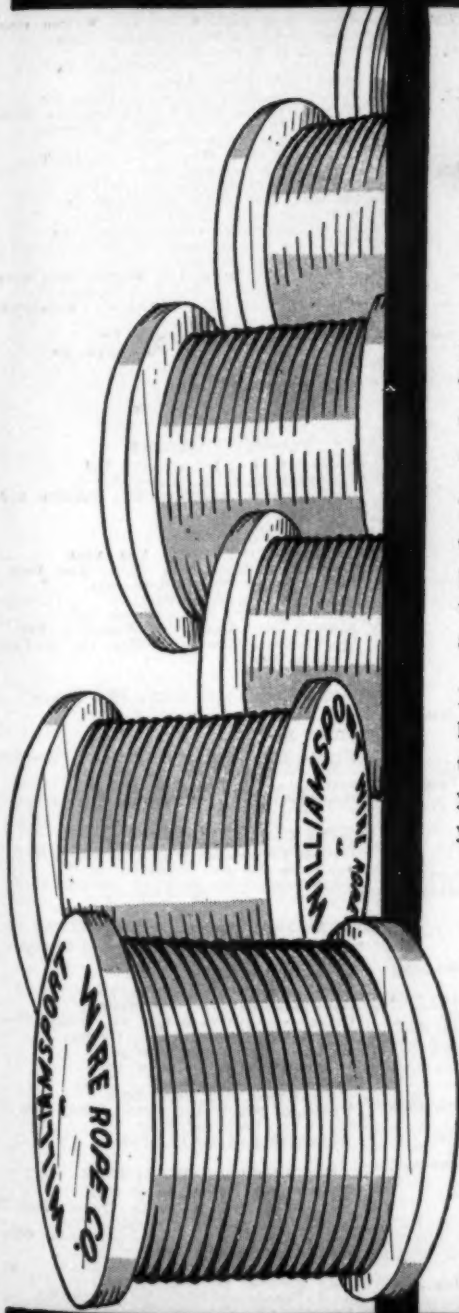
In spite of the care exercised at warehouses, sometimes a rope is taken from the wrong reel—If it's "Williamsport" you can easily check it. If it isn't, well you simply don't get this protection.

*Williamsport stocks in every important shipping center in U. S. A.*

### WILLIAMSPORT WIRE ROPE CO.

*Main Office and Works*  
**WILLIAMSPORT, PA.**

*General Sales Office*  
**PEOPLES' GAS BLDG., CHICAGO**



# Where to Purchase

## SHARPENERS, DRILL STEEL

\*Sullivan Machinery Co., Chicago  
Gardner-Denver Co., Quincy, Ill.  
Hardsag Wender Drill Co., Ottumwa, Iowa  
Ingersoll-Rand Co., New York

## SHORES

Concrete Engineering Co., Omaha, Neb.  
Dayton Sare Grip & Shore Co., Dayton, Ohio  
Fischer & Hayes Rope & Steel Co., Chicago  
M. & M. Wire Clamp Co., Minneapolis  
The O. D. G. Co., Owensboro, Ky.  
H. W. Ross Co., Cincinnati, Ohio  
Roe-Meyer-Recht Co., Cincinnati, Ohio  
Symons Clamp & Mfg. Co., Chicago  
Universal Form Clamp Co., Chicago

## SHOVELS, CRAWLING TRACTOR

\*Bucyrus-Erie Co., Erie, Pa.  
\*Industrial Brownhoist Corp., Cleveland  
\*Thew Shovel Co., Lorain, Ohio  
\*Trackson Co., Milwaukee  
American Hoist & Derrick Co., St. Paul  
Ohio Power Shovel Co., Lima, O.  
Speeder Mchky. Corp., Cedar Rapids, Iowa

## SHOVELS, ELECTRIC

\*Ray City Shovels, Inc., Bay City, Mich.  
\*Bucyrus-Erie Co., Erie, Pa.  
\*Industrial Brownhoist Corp., Cleveland  
\*Koehring Co., Milwaukee, Wis.  
\*Osgood Company, Marion, Ohio  
\*Thew Shovel Co., Lorain, Ohio  
American Hoist & Derrick Co., St. Paul  
Byers Mach. Co., Ravenna, Ohio  
Link-Belt Co., Chicago  
Marion Steam Shovel Co., Marion, Ohio  
Ohio Power Shovel Co., Lima, O.  
Speeder Mchky. Corp., Cedar Rapids, Iowa

## SHOVELS, GASOLINE

\*Ray City Shovels, Inc., Bay City, Mich.  
\*Bucyrus-Erie Co., Erie, Pa.  
\*Industrial Brownhoist Corp., Cleveland  
\*Insley Mfg. Co., Indianapolis  
\*Koehring Co., Milwaukee, Wis.  
\*Osgood Company, Marion, Ohio  
\*Thew Shovel Co., Lorain, Ohio  
\*Trackson Co., Milwaukee  
American Hoist & Derrick Co., St. Paul  
American Steel Dredge Co., Ft. Wayne, Ind.  
Austin Machine Corp., Muskegon, Mich.  
Byers Mach. Co., Ravenna, Ohio  
General Excavator Co., Marion, Ohio  
Harnischfeger Corp., Milwaukee, Wis.  
Keystone Driller Co., Beaver Falls, Pa.  
Link-Belt Co., Chicago  
Marion Steam Shovel Co., Marion, Ohio  
McMyler Interstate Co., Cleveland, Ohio  
Mead-Morrison Mfg. Co., Boston  
Northwest Engineering Works, Chicago  
Ohio Power Shovel Co., Lima, O.  
Orion Crane & Shovel Co., Chicago  
Speeder Mchky. Corp., Cedar Rapids, Iowa  
Star Drilling Machine Co., Akron, Ohio  
Universal Power Shovel Co., Highland Park, Mich.

## SHOVELS, STEAM

\*Bucyrus-Erie Co., Erie, Pa.  
\*Industrial Brownhoist Corp., Cleveland  
\*Osgood Company, Marion, Ohio  
\*Thew Shovel Co., Lorain, Ohio  
American Hoist & Derrick Co., St. Paul  
Marion Steam Shovel Co., Marion, Ohio  
Orion Crane & Shovel Co., Chicago  
Keystone Driller Co., Beaver Falls, Pa.

## SHOVELS, SPADES AND SCOOPS

American Mfg. Co., Chattanooga, Tenn.  
Ames Shovel & Tool Co., Boston  
Baldwin Tool Works, Parkersburg, W. Va.  
Beall Bros. Co., Alton, Ill.  
Connant Shovel Co., Connant, Ohio  
Indiana Shovel Co., New Castle, Ind.  
Jackson Shovel Co., Montpelier, Ind.  
Pittsburgh Shovel Co., Pittsburgh, Pa.  
Wood Shovel & Tool Co., Fiqua, Ohio  
Wyoming Shovel Works, Wyoming, Pa.

## SIDEWALK AND ROAD FORMS (See Forms, Concrete)

## SIGNS, STREET AND ROAD

Alumond Sign & Signal Co., Chicago  
Auto Sign Display Co. of Missouri, St. Louis, Mo.  
Baltimore Enamel & Novelty Co., Baltimore  
Elkhart Foundry & Machine Co., Elkhart, Ind.  
Everan-Century Sign Co., Boston  
Ingram-Richardson Mfg. Co., Beaver Falls, Pa.  
A. D. Joslin Mfg. Co., Manistee, Mich.  
Lyle-Sigas, Minneapolis, Minn.  
Municipal Street Sign Co., New York  
Niles Machine Co., Lebanon, N. H.  
Person-Majestic Mfg. Co., Worcester, Mass.  
Redder Signal Co., Cleveland, Ohio

Rochester Street Signal Co., Rochester, N. Y.  
Standard Mfg. Co., Cedar Falls, Iowa  
Union Iron Products Co., E. Chicago, Ind.  
Western Stamping & Mfg. Co., St. Paul

## SLEEVES, TAPPING AND VALVE

Mauller Company, Decatur, Ill.  
Rensselaer Valve Co., Troy, N. Y.  
A. P. Smith Mfg. Co., East Orange, N. J.

## SLUICE GATES (See Gates, Sluice)

## SNOKE STACKS (See Chimneys, Steel)

## SNOW REMOVAL MACHINERY

\*Allis-Chalmers Mfg. Co., Springfield, Ill.  
\*Austin-Western Road Machinery Co., Chicago  
\*Baker Mfg. Co., Springfield, Ill.  
\*Barber-Greene Co., Aurora, Ill.  
\*Caterpillar Tractor Co., San Leandro, Cal.  
\*Cleveland Tractor Co., Cleveland, Ohio  
\*Good Roads Machinery Co., Kennett Sq., Pa.  
\*George Hales Mfg. Co., New York  
\*Killefer Mfg. Co., Los Angeles, Calif.  
\*N. P. Nelson Iron Works, Passaic, N. J.  
\*W. A. Riddell Co., Bucyrus, Ohio  
\*Trackson Co., Milwaukee, Wis.  
Austin Mfg. Co., Chicago  
Byers Mach. Co., Ravenna, Ohio  
C. D. Edwards Mfg. Co., Albert Lea, Minn.  
Fox Rotary Snow Broom Co., New York  
Carl H. Frink, Thousand Islands, N. Y.  
The Hall Company, Milwaukee, Wis.  
Klaner Mfg. Co., Dubuque, Iowa  
LaPlant-Obate Mfg. Co., Cedar Rapids, Iowa  
Mack Trucks, Inc., New York  
Maine Steel Products Co., So. Portland, Me.  
Mead-Morrison Mfg. Co., E. Boston  
New England Road Machy. Co., So. Boston, Mass.  
Owensboro Ditcher & Grader Co., Owensboro, Ky.  
Rotary Snow Plow Co., Minneapolis  
Walsh's Holyoke St. Blr. Works, Holyoke, Mass.  
Walter Snow Fighters, L. I. City, N. Y.  
Wausau Iron Wks., Wausau, Wis.

## SNOW FENCING

\*Good Roads Machinery Co., Kennett Sq., Pa.  
American Fence Const. Co., New York  
Wickwire-Spencer Steel Co., New York

## SPADES (See Shovels)

## SPRATERS, ASPHALT AND TAR

Kinney Mfg. Co., Boston  
Littleford Bros., Cincinnati

## SPRAYING MACHINERY FOR TREES

John Bean Mfg. Co., Lansing, Mich.  
Deming Co., Salem, Ohio  
Field Force Pump Co., Elmira, N. Y.  
Pitshenry-Guptill Co., E. Cambridge, Mass.  
Friend Mfg. Co., Gasport, N. Y.  
Hardie Mfg. Co., Hudson, Mich.

## SPRAY PAINTING MACHINERY (See Painting Machinery)

## SPREADERS, SAND

\*Good Roads Machy. Co., Kennett Square, Pa.  
\*Warren Bros. Co., Boston, Mass.  
Goroco Mechanical Spreader Co., Philadelphia  
Highway Service Co., New Bedford, Mass.  
Tarrant Co., Saratoga Springs, N. Y.

## SPREADERS, STONE

\*Austin-Western Road Machinery Co., Chicago  
\*The Burch Corp., Crestline, Ohio  
Gallon Iron Works & Mfg. Co., Gallon, Ohio  
Shaw-Enoch Tractor Co., Minneapolis  
Universal Road Machinery Co., Kingston, N. Y.

## STACKS, STEEL

\*Blaw-Knox Co., Pittsburgh, Pa.  
\*Connery & Co., Inc., Philadelphia  
\*Heltzel Steel Form & Iron Co., Warren, Ohio  
\*Joseph Honhorst Co., Cincinnati, Ohio  
Birmingham Tank Co., Birmingham, Ala.  
Canton Art Metal Co., Canton, Ohio  
Chattanooga Boiler & Tank Co., Chattanooga, Tenn.  
Chicago Bridge & Iron Works, Chicago  
Graver Corp., Chicago  
Hall Co., Milwaukee, Wis.  
Int'l Comb. Eng. Corp., Chattanooga, Tenn.  
Lancaster Iron Works, Lancaster, Pa.  
Littleford Bros., Cincinnati, Ohio  
New York Central Iron Works Co., Inc., Hagerstown, Md.  
Tippett & Wood, Phillipsburg, Pa.  
Petroleum Iron Works Co., Sharon, Pa.  
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.  
W. B. Seale & Sons, Pittsburgh, Pa.

## STANDPIPES AND ELEVATED TANKS

W. E. Caldwell Co., Louisville, Ky.  
Chatt. Blr. & Tank Co., Chattanooga, Tenn.  
Chicago Bridge & Iron Works, Chicago  
R. D. Cole Mfg. Co., Newnan, Ga.  
Int'l Comb. Eng. Corp., Chattanooga, Tenn.  
Lancaster Iron Works, Lancaster, Pa.  
Pacific Tank & Pipe Co., San Francisco  
Petroleum Iron Works Co., Sharon, Pa.  
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.  
J. S. Schofield's Sons Co., Macon, Ga.  
Tippett & Wood, Phillipsburg, Pa.  
United Iron Works, Inc., Kansas City, Mo.

## STEAM SHOVELS (See Shovels, Steam)

## STEEL PLATE CONSTRUCTION

\*Blaw-Knox Co., Pittsburgh, Pa.  
\*Connery & Co., Philadelphia  
\*Heltzel Steel Form & Iron Co., Warren, Ohio  
\*Joseph Honhorst Co., Cincinnati, Ohio  
\*Union Iron Works, Hoken, N. J.  
Bethlehem Steel Co., Bethlehem, Pa.  
Biggs Boiler Works, Akron, Ohio  
Birmingham Tank Co., Birmingham, Ala.  
Chatt. Boiler & Tank Co., Chattanooga, Tenn.  
Chicago Bridge & Iron Works, Chicago  
Graver Corp., East Chicago, Ill.  
Int'l Comb. Eng. Corp., Chattanooga, Tenn.  
Hall Co., Milwaukee, Wis.  
Hendrick Mfg. Co., Carbondale, Pa.  
Lancaster Iron Works, Lancaster, Pa.  
Littleford Bros., Cincinnati, Ohio  
McClintic-Marshall Co., Pittsburgh, Pa.  
New York Central Iron Works Co., Inc., Hagerstown, Md.  
Pennsylvania Bridge Co., Beaver Falls, Iowa  
Petroleum Iron Works Co., Sharon, Pa.  
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.  
Ritter-Conley Co., Pittsburgh, Pa.  
W. B. Seale & Sons, Pittsburgh, Pa.

## STEEL SHEET PILING

\*Wemlinger, Inc., New York

## STEEL TOWERS, CONCRETE

\*Insley Mfg. Co., Indianapolis, Ind.  
\*Lakewood Engr. Co., Cleveland, O.  
\*Ransome Conc. Machinery Co., Dunellen, N. J.

## STOKERS, MECHANICAL

Babcock & Wilcox Co., New York  
Combustion Engineering Corp., New York  
Dayton Stoker Co., Dayton, Ohio  
Detroit Stoker Co., Detroit  
Green Eng. Co., East Chicago, Ind.  
Sanford Riley Stoker Co., Worcester, Mass.  
Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

## STREET AND ROAD SIGNS (See Signs)

## STREET BROOMS

Kendallville Broom & Brush Co., Kendallville, Ind.  
Joseph Lay Co., Portland, Ind.  
Osborn Mfg. Co., Cleveland, Ohio

## STREET CLEANERS' CARTS

Durlach Can & Iron Works, Brooklyn, N. Y.  
Rochester Can Co., Rochester, N. Y.  
Tarrant Mfg. Co., Saratoga Springs, N. Y.

## STREET FLUSHERS AND SPRINKLERS

\*Austin-Western Road Machy. Co., Chicago  
Austin Mfg. Co., Chicago  
Autocar Co., Ardmore, Pa.  
E. D. Elyre & Co., Oregon, Ill.  
Federal Motor Truck Co., Detroit  
Gallon Iron Works & Mfg. Co., Gallon, Ohio  
General Motors Truck Co., Chicago  
Hall Co., Milwaukee, Wis.  
Charles Hyass & Co., New York  
Kinney Mfg. Co., Boston  
Mack Trucks, Inc., New York  
Municipal Supply Co., South Bend, Ind.  
White Co., Cleveland, Ohio  
Whitehead & Kales Co., Detroit

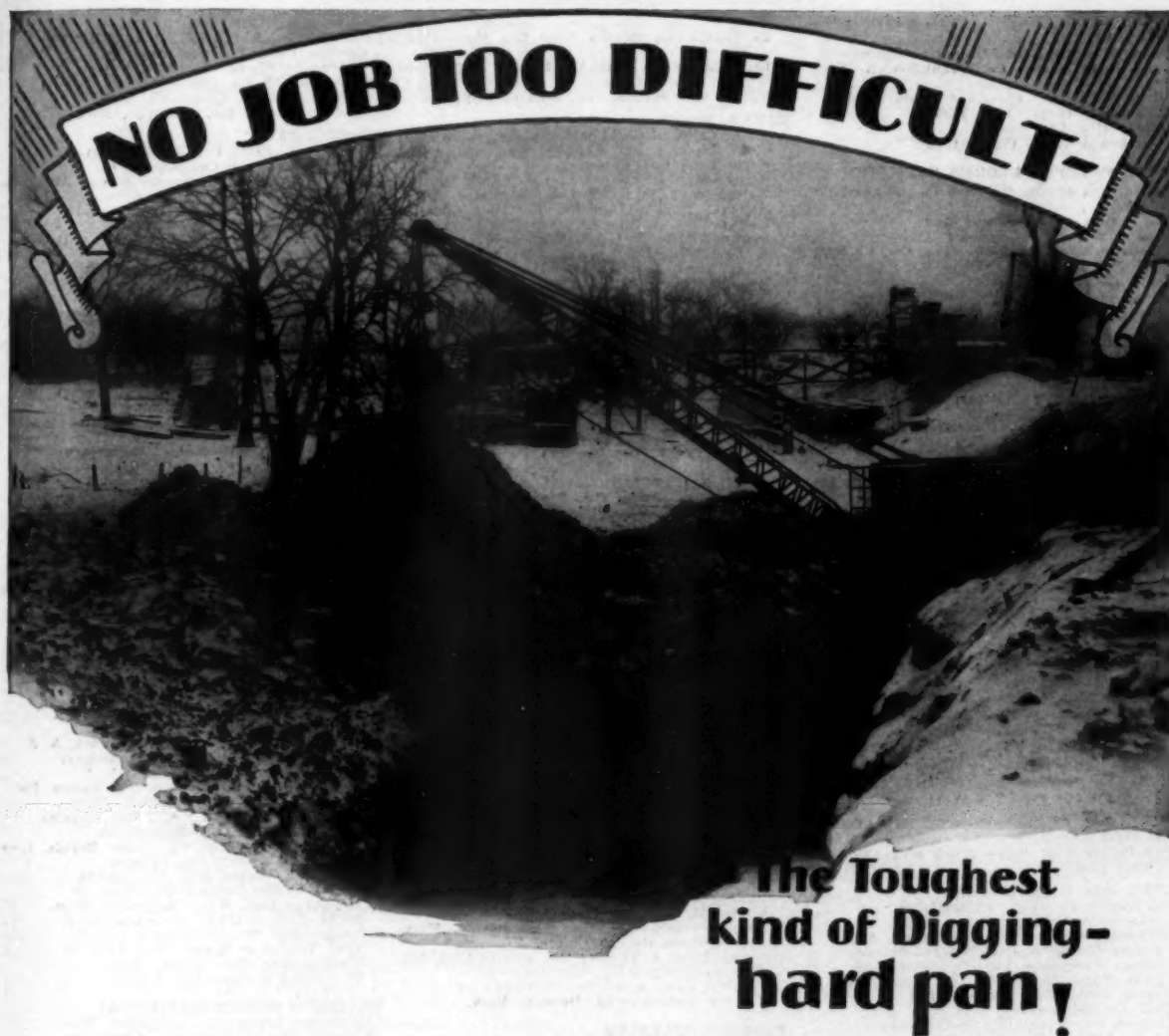
## STREET LIGHTING EQUIPMENT

\*Novo Engine Co., Lansing, Mich.  
American Conc. Marblette Co., Forest Park, Ill.  
J. B. Grew & Sons, Chicago  
Electric Ry. Equipment Co., Cincinnati, Ohio  
Holophane Co., New York  
King Mfg. Co., Chicago  
King Material Co., So. Milwaukee, Wis.  
J. S. Schofield's Sons Co., Macon, Ga.  
Union Metal Mfg. Co., Canton, Ohio  
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

## STREET SIGNS (See Signs, Street)

If you find any errors or omissions in this Where to Purchase list, please send corrections to CONTRACTORS AND ENGINEERS MONTHLY





**T**HE Moore Speedcrane, "Made in Manitowoc", "fits in" tight places. It's easily converted into Shovel, Trenchoe and Dragline.

One user writes, "Considering all facts, time saved in each separate operation, economy of upkeep and repair and operation, we feel that the Moore Speedcrane is one of the best cranes built and therefore an asset to any contractor's plant."

Write for detail information — it does not obligate you.

MANITOWOC ENGINEERING WORKS, Manitowoc, Wis.

(Sole Licensee to manufacture and sell Moore Speedcranes and Shovels)

Chicago Agents: MOORE SPEEDCRANE CO., 2916 W. 26th Street

Eastern Sales Agents: FORSYTHE BROS., 30 Church Street, New York, N. Y.

**SPEEDCRANE**  
 MOORE • MANITOWOC  
**SHOVEL ~ CRANE ~ TRENCHOE ~ DRAGLINE**

Do you mention the CONTRACTORS AND ENGINEERS MONTHLY when writing? Please do.

# Where to Purchase

## STREET SWEEPERS

\*Austin-Western Road Mch. Co., Chicago  
 Acme Road Mch. Co., Frankfort, N. Y.  
 Austin Mfg. Co., Chicago  
 Butler Sales Co., Cleveland, Ohio  
 Elgin Mfg. Corp., New York  
 Kinney Mfg. Co., Boston  
 Whitehead & Kales Co., Detroit

## STREET SWEEPER BROOMS REFILLED

Kendallville Broom & Brush Co., Kendallville, Ind.  
 Joseph Lay Co., Portland, Ind.  
 Osborn Mfg. Co., Cleveland, Ohio  
 Standard Brush & Broom Mfg. Co., Chicago

## STUMP PULLERS

\*Reese Bros., Inc., Seattle, Wash.  
 H. L. Bennett & Co., Westerville, Ohio  
 Ersted Mfg. Co., Portland, Ohio  
 LaPlant-Chaste Mfg. Co., Cedar Rapids, Iowa  
 John Waldron Corp., New Brunswick, N. J.

## SUBGRADING MACHINES

\*Blaw-Knox Co., Pittsburgh, Pa.  
 \*Kochring Co., Milwaukee  
 \*Lakewood Eng. Co., Cleveland, Ohio  
 Ted Carr & Co., Chicago  
 The Hug Co., Highland, Ill.  
 Shaw-Enochs Tractor Co., Minneapolis

## SURFACES & GRINDERS, CONCRETE

\*Tousley Tool Co., Cleveland  
 Chicago Pneumatic Tool Co., New York  
 Cleveland Pneumatic Tool Co., Cleveland  
 Concrete Surfacing Machy. Co., Cincinnati  
 The Dallett Co., Philadelphia  
 Ingersoll-Rand Co., New York

## SURVEYORS' INSTRUMENTS (See Instruments)

## SWITCHBOARDS

\*Allis-Chalmers Mfg. Co., Milwaukee  
 \*General Electric Co., Schenectady, N. Y.  
 Wagner Electric Mfg. Co., St. Louis, Mo.  
 Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

## TAMPERS, PNEUMATIC

\*Independent Pneumatic Tool Co., Chicago, Ill.  
 Chicago Pneumatic Tool Co., New York  
 Ingersoll-Rand Co., New York

## TAMPING MACHINES, CONCRETE BLOCK

Cement Block Machinery Co., Newark, N. J.  
 Zagelmeyer Cast Stone Block Mch. Co., Bay City, Mich.

## TANKS, AIR COMPRESSOR

\*Connery & Co., Inc., Philadelphia  
 Biggs Boiler Works, Akron, Ohio  
 Birmingham Tank Co., Birmingham, Ala.  
 Chicago Bridge & Iron Works, Chicago  
 Chicago Pneumatic Tool Co., New York  
 Curtis Pneu. Mch. Co., St. Louis, Mo.  
 Graver Corp., East Chicago, Ind.  
 Hell Co., Milwaukee, Wis.  
 Indiana Air Pump Co., Indianapolis  
 Ingersoll-Rand Co., New York  
 Lancaster Iron Works, Lancaster, Pa.  
 Littleford Bros., Cincinnati, Ohio  
 Nagle Engine & Boiler Works, Erie, Pa.  
 National Tube Co., Pittsburgh, Pa.  
 Petroleum Iron Works Co., Sharon, Pa.  
 Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.  
 W. B. Seale & Sons, Pittsburgh, Pa.  
 Westinghouse Tract. Brake Co., Wilmerding, Pa.  
 Worthington Pump & Mch. Co., New York

## TANKS, STEEL

\*Columbian St. Tank Co., Kansas City, Mo.  
 \*Connery & Co., Philadelphia  
 \*Joseph Honhorst Co., Cincinnati, Ohio  
 Bauman Mfg. Co., Millersville, Pa.  
 Biggs Boiler Works, Akron, Ohio  
 Birmingham Tank Co., Birmingham, Ala.  
 S. F. Bowser & Co., Inc., Ft. Wayne, Ind.  
 Butler Mfg. Co., Minneapolis, Minn.  
 J. I. Case Threshing Machine Co., Racine, Wis.  
 W. E. Caldwell Co., Louisville, Ky.  
 Canton Art Metal Co., Canton, Ohio  
 Chattanooga Boiler & Tank Co., Chattanooga, Tenn.  
 Chicago Bridge & Iron Works, Chicago  
 Dover Boiler Works, New York  
 Edwards Mfg. Co., Cincinnati, O.  
 Farrell Mfg. Co., Joliet, Ill.  
 C. C. Foote Co., Middletown, Ohio  
 Graver Corp., E. Chicago, Ind.  
 R. Hardesty Mfg. Co., Denver, Colo.  
 Int'l Comb. Eng. Corp., Chattanooga, Tenn.  
 Hell Co., Milwaukee, Wis.  
 Hendrick Mfg. Co., Carbondale, Pa.  
 Lancaster Iron Works, Lancaster, Pa.  
 Littleford Bros., Cincinnati, Ohio  
 Nagle Eng. & Boiler Works, Erie, Pa.  
 New York Central Iron Works Co., Hagerstown, Md.  
 Pacific Tank & Pipe Co., San Francisco  
 Petroleum Iron Works Co., Sharon, Pa.

Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.  
 Ritter-Conley Co., Pittsburgh, Pa.  
 W. B. Seale & Sons, Pittsburgh  
 United Iron Works, Inc., Kansas City, Mo.

## TANKS, WOOD

W. E. Caldwell Co., Louisville, Ky.  
 G. M. Davis & Son, Palatka, Fla.  
 Eagle Tank Co., Chicago  
 Hauser-Stander Tank Co., Cincinnati, Ohio  
 Kalamazoo Tank & Silo Co., Kalamazoo, Mich.  
 National Tank & Pipe Co., Portland, Ore.  
 Pacific Tank & Pipe Co., San Francisco  
 Redwood Mfrs. Co., San Francisco  
 A. T. Stearns Lumber Co., Boston  
 U. S. Wind Eng. & Pump Co., Batavia, Ill.  
 Wendnagel & Co., Chicago

## TAPES, STEEL AND METALLIC

Eugene Dietgen Co., New York  
 Keuffel & Esser Co., Hoboken, N. J.  
 Lufkin Rule Co., Saginaw, Mich.  
 The L. S. Starrett Co., Athol, Mass.

## TAR

\*Barrett Co., New York  
 American Tar Products Co., Pittsburgh, Pa.

## TAR KETTLES (See Kettles)

## TBAWING OUTFITS

\*Chassee Oil Burner Co., Elkhart, Ind.  
 Aeroll Burner Co., West New York, N. J.  
 Littleford Bros., Cincinnati  
 Hawk Mfg. Co., Brooklyn, N. Y.

## TIES, STEEL

Carnegie Steel Co., Pittsburgh, Pa.  
 International Steel Tie Co., Cleveland, O.  
 Koppel Ind. Car & Equipment Co., Koppel, Pa.  
 Sweet's Steel Co., Williamsport, Pa.

## TIRES, RUBBER (For Motor Trucks)

Firestone Tire & Rubber Co., Akron, O.  
 Fisk Tire Co., Chicopee Falls, Mass.  
 Goodrich Rubber Co., Akron, O.  
 Goodyear Tire & Rubber Co., Akron, O.  
 Kelly Springfield Tire Co., New York  
 U. S. Tire Co., New York

## TOOL HOUSES, PORTABLE STEEL

\*Blaw-Knox Co., Pittsburgh, Pa.  
 Littleford Bros., Cincinnati, Ohio

## TORCHES, OIL HEATING

\*Chassee Oil Burner Co., Elkhart, Ind.  
 \*Connery & Co., Philadelphia, Pa.  
 Hawk Mfg. Co., Brooklyn, N. Y.  
 Hoosier Paint Works, Ft. Wayne, Ind.  
 Littleford Bros., Cincinnati, Ohio  
 Mead-Morrison Mfg. Co., East Boston, Mass.  
 Alex. Milburn Co., Baltimore, Md.  
 Sewall Paint & Varnish Co., Kansas City, Mo.  
 Sherwin-Williams Co., Cleveland, O.  
 Tropical Paint & Oil Co., Cleveland, O.  
 Truscon Laboratories, Detroit, Mich.

## TORCHES, WELDING

\*Teledo Pressed Steel Co., Toledo, Ohio  
 McCloskey Torch Co., Toledo, Ohio

## TOWERS (See Standpipes and Elevated Tanks)

## TRACKS, INDUSTRIAL AND PORTABLE

\*Lakewood Eng. Co., Cleveland, O.  
 Atlas Car & Mfg. Co., Cleveland, O.  
 Bethlehem Steel Co., Bethlehem, Pa.  
 Chase Foundry & Mfg. Co., Columbus, O.  
 Easton Car & Construction Co., Easton, Pa.  
 C. W. Hunt Co., Inc., W. N. Brighton, N. Y.  
 Koppel Ind. Car & Equipment Co., Koppel, Pa.  
 Sweet's Steel Co., Williamsport, Pa.

## TRACTION THREADS (See Treads, Traction)

## TRACTORS

\*Allis-Chalmers Mfg. Co., Milwaukee  
 \*Atlas Engineering Co., Clintonsville, Wis.  
 \*Caterpillar Tractor Co., San Leandro, Calif.  
 \*Cleveland Tractor Co., Cleveland, O.  
 \*Huber Mfg. Co., Marion, O.  
 \*International Harvester Co., Chicago  
 \*John Lunsford Co., New Holstein, Wis.  
 \*W. A. Riddell Co., Bucyrus, O.  
 Rogers Bros. Corp., Albion, Pa.  
 \*United Tractors & Equipment Corp., Chicago  
 Advance-Rumely Tractor Co., Laporte, Ind.  
 Bates Mfg. Co., Joliet, Ill.  
 J. I. Case Threshing Machine Co., Racine, Wis.  
 Electric Wheel Co., Quincy, Ill.  
 Emerson-Brantingham, Rockford, Ill.  
 Hart-Parr Co., Charles City, Ia.  
 Lombard Tractor & Truck Corporation, N. Y.  
 Mack Trucks, Inc., New York  
 Mead-Morrison Mfg. Co., E. Boston  
 Minneapolis Steel & Mach. Co., Minneapolis  
 Shaw-Enochs Tractor Co., Minneapolis  
 Wehr Co., Milwaukee

## TRACTOR HITCHES

\*Gustav Schaefer Co., Cleveland  
 Trail-IT Co., St. Paul, Minn.  
 Whitehead & Kales Co., Detroit

## TRAFFIC LINE MARKING MACHINES

Carrara Paint Co., Cleveland, O.  
 Continental Prod. Co., Euclid, O.  
 Line-O-Graph Co., N. Y.  
 Littleford Bros., Cincinnati, Ohio  
 Newway Engr. Co., Newway, Mich.

## TRAFFIC PAINT

J. E. Bauer Co., Los Angeles, Cal.  
 Continental Prod. Co., Euclid, O.  
 E. I. du Pont de Nemours & Co., Wilmington, Del.  
 Hoosier Paint Wks., Ft. Wayne, Ind.  
 Hamline Bros., Baltimore, Md.  
 Tropical Paint & Oil Co., Cleveland, O.

## TRAFFIC PLATES

Alan Wood Iron & Steel Co., Philadelphia  
 American Pressed Steel Co., Philadelphia  
 Central Iron & Steel Co., Harrisburg, Pa.

## TRAFFIC SIGNAL EQUIPMENT

\*Teledo Pressed Steel Co., Toledo, Ohio  
 Acme Traffic Signal Co., Chicago  
 Alumord Sign & Signal Co., Chicago  
 Amer. Gas Accumulator Co., Elizabeth, N. J.  
 Auto Sign Display Co. of Mo., St. Louis, Mo.  
 Crestney Traffic Guide Co., Madison, Wis.  
 Crouse-Hinds Co., Syracuse, N. Y.  
 Eagle Signal Sales Corp., Moline, Ill.  
 Esaco Mfg. Co., Peoria, Ill.  
 Everna-Century Sign Co., Boston  
 Griswold Safety Signal Co., Minneapolis  
 Horai Signal Mfg. Corporation, Newark, N. J.  
 Line Material Co., South Milwaukee, Wis.  
 Little Giant Co., Mankato, Minn.  
 Lyle-Signs, Minneapolis, Minn.  
 Rochester Street Signal Co., Rochester, N. Y.  
 Tokheim Oil Tank & Pump Co., Ft. Wayne, Ind.  
 Traffic Equipment Corp., N. Y.  
 Union Iron Prod. Co., E. Chicago, Ind.  
 Weisbach Traffic Signal Co., Philadelphia

## TRAILERS FOR TRUCKS AND TRACTORS

\*Electric Wheel Co., Quincy, Ill.  
 \*Euclid Crane & Hoist Co., Euclid, O.  
 \*Highway Trailer Co., Edgerton, Wis.  
 \*Rogers Bros. Corporation, Albion, Pa.  
 \*Gustav Schaefer Co., Cleveland  
 Arcadia Trailer Corporation, Newark, N. J.  
 Detroit Trailer & Mach. Co., Detroit  
 Eagle Wagon Works, Auburn, N. Y.  
 Easton Car & Construction Co., Easton, Pa.  
 Fruehauf Trailer Co., Detroit, Mich.  
 Hercules Trailer Mfg. Co., Los Angeles  
 Imperial Mach. Co., Minneapolis  
 LaPlant-Chaste Mfg. Co., Cedar Rapids, Iowa  
 Lee Trailer & Body Co., Chicago  
 Little Red Wagon Mfg. Co., Omaha  
 Miami Trailer-Scrapper Co., Troy, O.  
 Muskogee Iron Wks., Muskogee, Okla.  
 Smith Trailer Corp., Syracuse, N. Y.  
 Trailmobile Co., Cincinnati  
 Troy Trailer & Wagon Co., Troy, O.  
 Warner Mfg. Co., Beloit, Wis.  
 Whitehead & Kales Co., Detroit

## TRAILERS, HEAVY MACHINERY

\*Highway Trailer Co., Edgerton, Wis.  
 \*Rogers Bros. Corporation, Albion, Pa.

## TRAILERS, INDUSTRIAL

\*Electric Wheel Co., Quincy, Ill.  
 \*Highway Trailer Co., Edgerton, Wis.  
 \*Lakewood Eng. Co., Cleveland, O.  
 \*Rogers Bros. Corporation, Albion, Pa.  
 \*Gustav Schaefer Co., Cleveland  
 Chase Ferry & Mfg. Co., Columbus, O.  
 Clark Tractor Co., Battle Creek, Mich.  
 Detroit Trailer & Machinery Co., Detroit  
 Easton Car & Construction Co., Easton, Pa.  
 LaPlant-Chaste Mfg. Co., Cedar Rapids, Iowa  
 Lee Trailer & Body Co., Plymouth, Ind.  
 Miami Trailer-Scrapper Co., Troy, O.  
 Trailmobile Co., Cincinnati  
 Whitehead & Kales Co., Detroit

## TRAILER COUPLINGS

\*Gustav Schaefer Co., Cleveland  
 Trail-IT Co., St. Paul, Minn.

## TRAMWAYS, AERIAL WIRE ROPE (See Aerial Wire Rope Tramways)

## TRANSFORMERS

\*Allis-Chalmers Mfg. Co., Milwaukee  
 Duncan Elec. Mfg. Co., Lafayette, Ind.  
 Enterprise Elec. Co., Warren, O.  
 General Elec. Co., Schenectady, N. Y.  
 Kuhlman Elec. Co., Bay City, Mich.  
 Maloney Electric Co., St. Louis, Mo.  
 Packard Electric Co., Warren, O.  
 Pittsburgh Trans. Co., Pittsburgh, Pa.  
 Wagner Elec. Corp., St. Louis, Mo.  
 Westinghouse Elec. & Mfg. Co., E. Pittsburgh

## TRANSITS AND LEVELS (See Instruments)

## TRANSMISSION MACHINERY, POWER

\*Allis-Chalmers Mfg. Co., Milwaukee  
 Chain Belt Co., Milwaukee  
 Dodge Mfg. Corp., Mishawaka, Ind.  
 Kent Machine Co., Kent, O.  
 Link-Belt Co., Chicago  
 Webster Mfg. Co., Chicago  
 Weller Mfg. Co., Chicago

# McCORMICK-DEERING

## INDUSTRIAL TRACTOR

### *The Versatile Mobile Power Plant*

**T**HE McCORMICK-DEERING Industrial Tractor has brought to users of mobile power a versatile unit to reduce costs.

More than 100 manufacturers are building equipment to be powered by the McCormick-Deering—a tribute to its remarkable flexibility and practically unlimited utility.

Its liberal power is available at the drawbar, belt, and power take-off. It pulls, pushes, and lifts. From the simplest service of hauling trailers it works on a wide range of jobs, such as operating road maintainers, hoists, cranes, winches, excavating machinery, air compressors, pumps, rock crushers, locomotives, back fillers, bulldozers, drag lines, loaders, shovels, . . . to mention a few.

A service organization maintained by 174 Company-owned branches, distributors, and dealers, the country over, assures the user that his McCormick-Deering powered machines will be kept on the job constantly.

A demonstration on your hardest job will show you why users in your own and other industries have put the McCormick-Deering on their payrolls.

◀ [ International Trucks are reducing hauling costs in the construction business by their economical operation and great capacity for work. ] ▶

*The International line includes the Special Delivery for loads up to ¾-ton; 1-ton Six-Speed Special; 4 and 6-cylinder Speed Trucks of 1½, 1¾, and 2-ton sizes; Heavy-Duty Trucks ranging from 2½ to 5-ton sizes. All are equipped with four-wheel brakes.*

#### INTERNATIONAL HARVESTER COMPANY

606 So. Michigan Ave. of America Chicago, Illinois  
(Incorporated)



*International Heavy-Duty Truck  
on the Illinois Deep Waterway*





# Where to Purchase

## TRASH CANS (See Cans)

## TREADS, SAFETY

\*Blaw-Knox Company, Pittsburgh, Pa.  
American Abrasive Metals Co., N. Y.  
American Mason Safety Tread Co., Lowell, Mass.  
Concrete Steel Co., N. Y.  
Norton Co., Worcester, Mass.

## TREADS, TRACTION

\*Caterpillar Tractor Co., San Leandro, Cal.  
\*Trackson Co., Milwaukee  
Belle City Mfg. Co., Racine, Wis.  
Cresper Wheel Co., Reading, Pa.  
Electric Wheel Co., Quincy, Ill.  
Tractor Grip Wheel Co., Toledo, O.  
Whitehead & Kales Co., Detroit

## TRENCH EXCAVATORS (See Excavators)

## TRENCH PUMPS (See Pumps, Contractors')

## TRUCKS, TANK & SPRINKLER (See Wagons, Tank & Sprinkler)

## TURBINES

Allis-Chalmers Mfg. Co., Milwaukee  
De Laval Steam Turbine Co., Trenton, N. J.  
General Electric Co., Schenectady, N. Y.  
Ingersoll-Rand Co., N. Y.  
Terry Steam Turbine Co., Hartford, Conn.  
Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

## TURNTABLES FOR MOTOR TRUCKS

\*Blaw-Knox Co., Pittsburgh, Pa.  
Champion Engine Co., Kenton, O.  
Easton Car & Construction Co., Easton, Pa.  
Freeman Mfg. Co., Racine, Wis.  
Hug Co., Highland, Ill.  
Western Structural Co., Moline, Ill.

## VALVES, CHECK

Chapman Valve Mfg. Co., Indian Orchard, Mass.  
Coffin Valve Co., Boston  
Ladlow Valve Mfg. Co., Troy, N. Y.  
Mich. Valve & Foundry Co., Detroit  
Rensselaer Valve Co., Troy, N. Y.

## VALVES, GATE AND INDICATOR POSTS

Chapman Valve Mfg. Co., Indian Orchard, Mass.  
Coffin Valve Co., Boston  
Columbian Iron Works, Chattanooga, Tenn.  
Crane Company, Chicago  
Darling Valve & Mfg. Co., Williamsport, Pa.  
Eddy Valve Co., Watertown, N. Y.  
Iowa Valve Co., Oskaloosa, Ia.  
Kennedy Valve Mfg. Co., Elmira, N. Y.  
Ladlow Valve Mfg. Co., Troy, N. Y.  
Michigan Valve & Foundry Co., Detroit  
Rensselaer Valve Co., Troy, N. Y.  
A. P. Smith Mfg. Co., E. Orange, N. J.  
Watrous Co., St. Paul  
R. D. Wood & Co., Philadelphia

## VALVES FOR GASOLINE ENGINES

\*Industrial Engine Parts Co., Inc., Cleveland

## VALVES, RELIEF

\*Noptune Motor Co., New York

## VALVES, TAPPING

Eddy Valve Co., Watertown, N. Y.  
Hays Mfg. Co., Erie, Pa.  
Kennedy Valve Mfg. Co., Elmira, N. Y.  
Ladlow Valve Co., Troy, N. Y.  
Michigan Valve & Foundry Co., Detroit  
Rensselaer Valve Co., Troy, N. Y.  
Watrous Co., St. Paul  
A. P. Smith Mfg. Co., E. Orange, N. J.

## VALVE BOXES AND HOUSINGS

\*Central Foundry Co., N. Y.  
Chapman Valve Mfg. Co., Indian Orchard, Mass.  
H. W. Clark Co., Mattoon, Ill.  
J. B. Clev & Sons, Chicago  
Columbian Iron Works, Chattanooga, Tenn.  
Darling Valve & Mfg. Co., Williamsport, Pa.  
Eddy Valve Co., Watertown, N. Y.  
Iowa Valve Co., Oskaloosa, Ia.  
Kennedy Valve Mfg. Co., Elmira, N. Y.  
Ladlow Valve Mfg. Co., Troy, N. Y.  
Mueller Co., Decatur, Ill.  
Rensselaer Valve Co., Troy, N. Y.  
A. P. Smith Mfg. Co., E. Orange, N. J.  
Watrous Co., St. Paul  
R. D. Wood & Co., Philadelphia

## VOTING EQUIPMENT FOR CITIES

Automatic Registering Machine Co., Jamestown, N. Y.  
Ideal Voting Booth Co., Sullivan, Ind.  
Douglas Manufacturing Co., Crete, Nebr.  
Pennsylvania Construction Co., Marietta, Pa.  
Kerr Manufacturing Co., Lansing, Mich.  
Van Dorn Iron Works Co., Cleveland, O.

## WAGONS (See Dump Carts and Wagons)

## WAGON BODIES (See Dump Bodies)

## WAGON LOADERS (See Loaders, Gravel)

## WAGONS & TRUCKS, TANK & SPRINKLER

\*Joseph Honhorst Co., Cincinnati, O.  
Acme Road Machinery Co., Frankfort, N. Y.

Butler Mfg. Co., Minneapolis, Minn.  
J. I. Case Threshing Machine Co., Racine  
Gallon Iron Works & Mfg. Co., Gallon, Ohio  
Hill Co., Milwaukee, Wis.  
Mack Trucks, Inc., New York

## WALL TIES

Berger Mfg. Co., Canton, O.  
Concrete Steel Co., N. Y.  
Consolidated Exp. Metal Co., Wheeling, W. Va.  
Hawley Mfg. Co., Chicago  
M. & M. Wire Clamp Co., Minneapolis  
Milwaukee Corr. Co., Milwaukee, Wis.  
Niagara Metal Stamp Corp., Niagara Falls, N. Y.  
Wedgit Tie Co., Inc., New York

## WASHERS, SAND AND GRAVEL

\*Allis-Chalmers Mfg. Co., Milwaukee  
Jeffrey Mfg. Co., Columbus, O.  
Link-Belt Co., Chicago  
Smith Engineering Works, Milwaukee  
Stephens-Adamsen Mfg. Co., Aurora, Ill.

## WATCHES, STOP

Sterling Stop Watch Co., New York

## WATER MAIN TAPPING MACHINES

Glauber Brass Mfg. Co., Cleveland  
Hays Mfg. Co., Erie, Pa.  
Mueller Co., Decatur, Ill.  
A. P. Smith Mfg. Co., E. Orange, N. J.

## WATER METERS (See Meters, Water)

## WATERPROOFING COMPOUNDS AND MATERIALS

\*Barber Asphalt Co., Philadelphia, Pa.  
\*Barrett Company, N. Y.  
\*Philip Carey Co., Cincinnati, O.  
\*Standard Oil Co. (Indiana), Chicago  
Anti-Hydro Waterproofing Co., Newark, N. J.  
Atlantic Refining & Asphalt Corp., Philadelphia  
Euclid Chemical Co., Cleveland  
Gendrie Steel Co., Youngstown, O.  
Master Builders Co., Cleveland, O.  
Minwax Co., N. Y.  
Ruberoid Co., N. Y.  
Sandusky Cement Co., Cleveland, O.  
Sonneborn Sons, Inc., N. Y.  
Texas Company, N. Y.  
Toch Brothers, N. Y.  
Truscon Laboratories, Detroit, Mich.

## WATER PURIFICATION (See also Filters)

\*Wallace & Tiernan Co., Inc., Newark, N. J.  
Cochrane Corp., Philadelphia  
Paradon Mfg. Co., Arlington, N. J.  
R. U. V. Co., N. Y.

## WATER PURIFICATION CHEMICALS

Arnold Hoffman & Co., Inc., N. Y.  
E. I. du Pont de Nemours & Co., Wilmington, Del.  
Electro Bleaching Gas Co., N. Y.  
General Chemical Co., N. Y.  
Hooker Electrochemical Co., N. Y.  
Mathieson Alkali Works, Inc., N. Y.  
Pennsylvania Salt Mfg. Co., Philadelphia

## WATER SOFTENERS

American Water Softener Co., Philadelphia  
Cochrane Corp., Philadelphia  
Graver Corp., E. Chicago, Ind.  
International Filter Co., Chicago  
Permutit Co., N. Y.  
W. B. Scalle & Sons, Pittsburgh, Pa.  
Wayne Tank & Pump Co., Ft. Wayne, Ind.

## WATER WASTE DETECTION

Empire Electric & Water Co., Inc., N. Y.  
Pitometer Co., N. Y.  
Simplex Valve & Meter Co., Philadelphia

## WATER WHEELS

\*Allis-Chalmers Mfg. Co., Milwaukee  
J. Lefel & Co., Springfield, O.  
I. F. Morris and De La Vergne, Inc., Hydr. Div., Philadelphia  
Newport News Shipbuilding & Dry Dock Co., Newport News, Va.  
Pelton Water Wheel Co., San Francisco  
S. Morgan Smith Co., York, Pa.  
Worthington Pump & Machinery Corp., N. Y.

## WATER WORKS PUMPS (See Pumps)

## WEIGHING MACHINES

\*Conveying Weigher Co., N. Y.

## WELDING APPARATUS

\*Orweld Acetylene Co., L. I. City, N. Y.  
Burke Electric Co., Erie, Pa.  
General Electric Co., Schenectady, N. Y.  
Lincoln Electric Co., Cleveland, O.  
Macloed Co., Cincinnati, O.  
Alex. Milburn Co., Baltimore, Md.  
Smith's Inventions, Inc., Minneapolis, Minn.  
U. S. Light & Heat Corp., Niagara Falls  
Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.  
Wilson Welder & Metals Co., Inc., Hoboken, N. J.

## WELLS, CONCRETE

Kelly Well Co., Grand Island, Neb.

## WELLS, GRAVEL WALL

Layne & Bowler, Inc., Memphis, Tenn.

## WELL-DRILLING AND BLAST HOLE MACHINES

\*The Burch Corp., Crestline, Ohio  
\*Loomis Machine Co., Tiffin, O.  
\*Sanderson Cyclone Drill Co., Orrville, O.  
Armstrong Mfg. Co., Waterloo, Ia.  
Burkhardt Co., Kiel, Wis.  
Keystone Driller Co., Beaver Falls, Pa.  
Star Drilling Machine Co., Akron, O.

## WELL SCREENS

A. D. Cook, Inc., Lawrenceburg, Ind.  
E. E. Johnson, Inc., St. Paul, Minn.

## WHEELBARROWS

\*General Wheelbarrow Co., Cleveland, O.  
\*Lansing Co., Lansing, Mich.  
Asheboro Wheelbarrow Co., Asheboro, N. C.  
Carolina  
American Steel Scraper Co., Sidney, Ohio  
Case Crane & Engg. Co., Columbus, Ohio  
Chattanooga Wheelbarrow Co., Chattanooga, Tenn.  
Cleveland Wheelbarrow Co., Cleveland, O.  
Fairbanks Co., N. Y.  
Jackson Mfg. Co., Harrisburg, Pa.  
Puffer-Hubbard Mfg. Co., Minneapolis  
Sidney Steel Scraper Co., Sidney, O.  
Sterling Wheelbarrow Co., Milwaukee  
Toledo Wheelbarrow Co., Toledo, O.

## WHEELS FOR ALL USES

\*Electric Wheel Co., Quincy, Ill.

## WHEELS, CRAWLER TYPE FOR WAGONS

\*Cresper Wheel Co., Reading, Pa.

## WINCHES

\*Beebe Bros., Inc., Seattle, Wash.  
\*Brown Clutch Co., Sandusky, O.  
\*Clyde Iron Works Sales Co., Duluth, Minn.  
\*Dobbie Foundry & Mach. Co., Niagara Falls  
\*Mundy Sales Corp., N. Y.  
\*Gustav Schaefer Co., Cleveland  
Advance-Rumely Thresher Co., La Porte, Ind.  
Bethlehem Steel Co., Bethlehem, Pa.  
Chisholm-Moore Mfg. Co., Cleveland, O.  
Dake Engine Co., Grand Haven, Mich.  
Ersted Mfg. Co., Portland, Ore.  
John T. Horton Co., New York  
Ingersoll-Rand Co., New York  
Lidgerwood Mfg. Co., Elizabeth, N. J.  
Mead-Morrison Mfg. Co., E. Boston  
Muskegon Iron Wks., Muskegon, Okla.  
Stephens-Adamsen Mfg. Co., Aurora, Ill.  
Street Bros. Mach. Works, Chattanooga

## WINDOW FRAMES AND SASH (Metallic)

\*Truscon Steel Co., Youngstown, O.  
Wm. Bayley Co., Springfield, O.  
Detroit Steel Prod. Co., Detroit  
E. D. Frederick Co., Holyoke, Mass.  
Gendrie Steel Co., Youngstown, O.  
David Lupton's Sons Co., Philadelphia  
Penn Metal Co., Boston  
Sykes Co., Chicago

## WIRE AND CABLE

\*American Steel & Wire Co., Chicago  
\*Williamsport Wire Rope Co., Williamsport, Pa.  
American Cable Co., N. Y.  
Copperweld Steel Co., Glassport, Pa.  
Fischer & Hayco Rope & Steel Co., Chicago  
General Electric Co., Schenectady, N. Y.  
Habirshaw Cable & Wire Corp., N. Y.  
Hazard Wire Rope Co., Wilkesbarre, Pa.  
Mac Whyte Co., Kenosha, Wis.  
Marion Insulated Wire & Rubber Co., Chicago  
National India Rubber Co., Bristol, R. I.  
New York Insulated Wire Co., N. Y.  
Okonite Co., Passaic, N. J.  
John A. Roebling's Sons Co., Trenton, N. J.  
Safety Cable Co., N. Y.  
Simplex Wire & Cable Co., Boston  
Standard Underground Cable Co., Pittsburgh, Pa.  
Tabular Woven Fabric Co., Pawtucket, R. I.

## WIRE MESH REINFORCEMENT

\*American Steel & Wire Co., Chicago  
\*Truscon Steel Co., Youngstown, O.  
National Steel Fabric Co., Pittsburgh, Pa.  
Wickwire-Spencer Steel Co., N. Y.

## WIRE ROPE FITTINGS

\*L. P. Green, Chicago  
John A. Roebling's Son Co., Trenton, N. J.

## WIRE ROPE (See Ropes, Wire)

## WOOD BLOCKS (See Paving Blocks)

## WOODWORKING MACHINES

\*American Saw Mill Machinery Co., Hackettstown, N. J.  
\*C. H. & E. Mfg. Co., Milwaukee, Wis.  
R. L. Carter Co., Phoenix, N. Y.  
Jaeger Portable Power Corp., Detroit  
Jones Superior Machine Co., Chicago  
Master Woodworker Mfg. Co., Detroit

# Are You Picking the Winners This Season?



Trackson Model LH shown in operation with Motor Grader—slashing costs in road work



Trackson Model DH equipped with shovel, handling dirt speedily and economically.



Trackson Model LH with bulldozer, nimbly moving dirt at less operating expense.

**W**HEN time limitations or bad weather threaten your profits, you need equipment that will never falter—that has stamina, reserve power and adaptability to meet every emergency . . . You need a Crawler Tractor that will hold on faithfully till the job is done.

The Trackson Model LH meets your demands for agile power and increased traction. Lighter in weight, it retains the standard speeds of the McCormick-Deering (agricultural) tractor and turns in its tracks. The Model DH provides irresistible strength for heavier tasks, protecting profits by outstanding performance.

For digging, moving, loading and grading, Trackson Crawlers save time, men and money. Adaptable to hundreds of uses, they definitely increase your earning powers. Equal in quality, endurance and efficiency are Trackson Shovels, Loaders, Cranes, Bulldozers and Hoists.



Trackson Model DH with crane results in better work completed in shorter time.

Get the facts! Write today for full details of how Trackson Tractor Equipment will enable you to do better work with greater economy. There are Trackson Dealers and Distributors everywhere. They will be glad to assist you in selecting just what you need.

## Trackson Company

FULL-CRAWLERS & TRACTOR EQUIPMENT

519 CLINTON ST.

MILWAUKEE, WIS.

FULL-CRAWLERS ★ BULLDOZERS ★ LOADERS ★ SHOVELS ★ CRANES

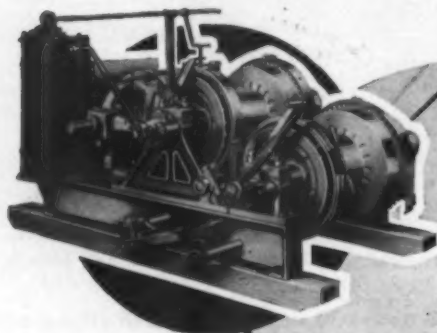
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# CLYDE

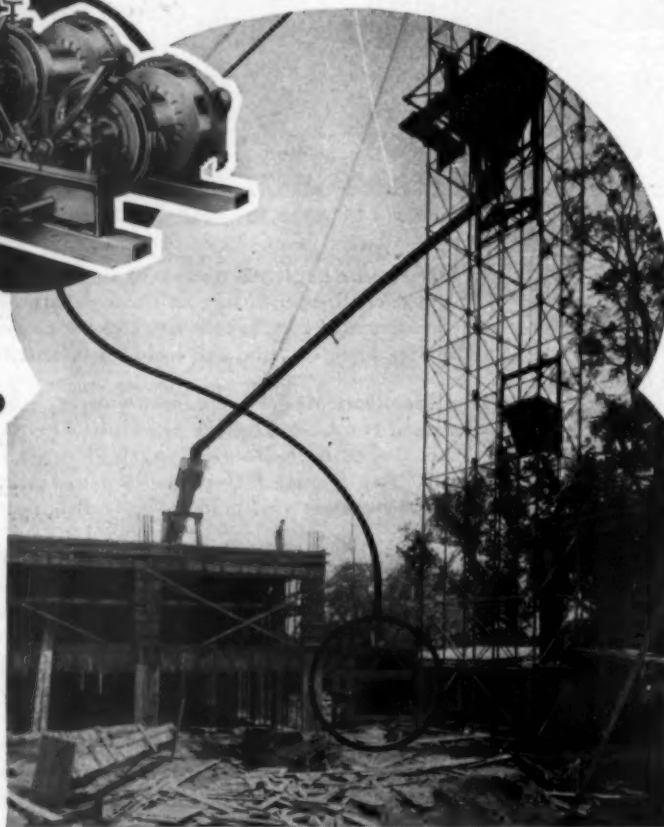
## HOISTS - DERRICKS

### - satisfactory equipment -

For the erection of three large apartment units at Kansas City, the C.O. Jones Building Co. needed fast, dependable equipment. A Clyde two drum electric hoist was used to operate the elevator and concrete bucket at the central mixing plant. 16,000 yards of concrete were required on this job and the performance of the complete installation gave absolute satisfaction.



You'll Take  
PRIDE  
In Your  
CLYDE



## CLYDE IRON WORKS SALES CO.

DISTRIBUTORS FOR CLYDE IRON WORKS DULUTH, MINNESOTA

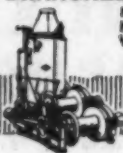
### - BRANCHES -

NEW ORLEANS: 308 MAGAZINE ST.  
PORTLAND, OREGON: 555 THURMAN ST.  
SEATTLE: 3410 FIRST AVENUE SOUTH  
CHICAGO: 11 SO. LA SALLE STREET

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VANCOUVER: BRITISH COLUMBIA  
1325 STANDARD BANK BLDG.



TWO MARKS OF



GUARANTEED QUALITY



When writing to advertisers please mention the CONTRACTORS AND ENGINEERS MONTHLY—Thank You.



## TIME TELLS THE TALE —

March 20th, 1929.

Blaw-Knox Co.,  
Pittsburgh, Pa.

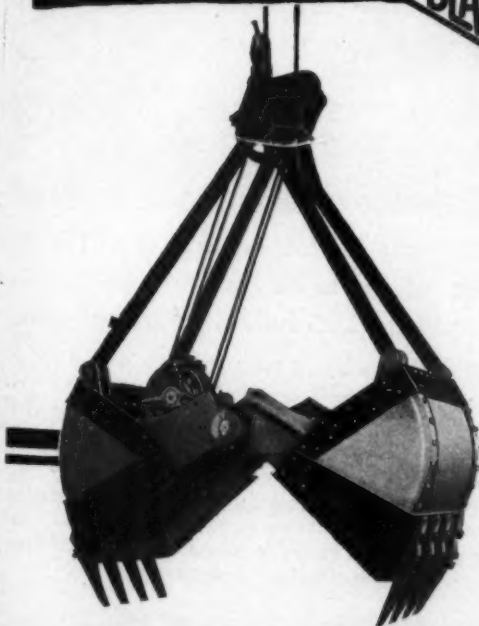
Dear Sir:

The writer has been going over our cost records on equipment repairs the past few days and no doubt it will interest you to know that I find the repairs to our four Blaw-Knox Clam Shell Buckets have been exceedingly low.

Considering that we have had the one half yard bucket nine years, and our last one yard bucket has handled over one half million tons of sand and gravel the repairs and parts purchased to date have been practically nothing. The few replacements which were necessary were received quickly and we had no trouble or inconvenience in making the changes.

Wishing you continued success, we are

Very truly yours,  
FROEMMING BROS., Inc.,  
By Ben Froemming  
Sec. & Treas.

BLAW-KNOX  
BUCKETS  
ENDURE!

March 8, 1929

Blaw-Knox Company  
Pittsburgh, Penna.

Dear Sir:

This is to advise you that our Blaw-Knox Dreadnaught Bucket, purchased in 1921, has given us excellent service.

This bucket has handled 250,000 tons of material during that period. The only repairs made on the bucket during that time was the replacing of two bushings in 1927.

The bucket is still in very good condition and is working at the present time.

Very truly yours  
Garvey-Weyenberg Construction Co.  
By C. J. Garvey

Blaw-Knox Company  
667 Farmers Bank Bldg., Pittsburgh, Pa.

Buffalo New York Philadelphia Baltimore Boston  
Birmingham Chicago Detroit Cleveland San Francisco

EXPORT DIVISION  
Milliken Bros.-Blaw Knox Corp., Canadian Pacific Bldg., New York

NOW more than ever Blaw-Knox Buckets are prepared to live up to their reputation for maximum performance with long life and negligible repair requirements. Improvements include Ball Bearing Sheaves which greatly reduce friction and increase operating efficiency and scientifically tempered cutting lips that resist wear to the utmost. Form 1059 describes 43 different Blaw-Knox Buckets in detail—copy free on request.

# "Caterpillars" build Waco Dam...



Shirley and Gunther, Contractors of Omaha, are handling the earth-moving part of the job on the dam at Waco, Texas. There are 850,000 cu. yds. of dirt to be handled. The dam is 65 ft. at the highest point and about 1¼ miles long. It will hold 23 billion gallons of water. There are 9 "Caterpillar" Sixtys on the job; equipped with electric lights and working two ten-hour shifts a day. They pull two 8-yard wagons—their longest haul is about 600 feet—they make about seventy five trips a shift. So do "Caterpillars" save men, money, minutes!

Prices—f. o. b. Peoria, Illinois

TEN . . . . .	\$1125	TWENTY . . . . .	\$1975
FIFTEEN . . . . .	\$1500	THIRTY . . . . .	\$2475
SIXTY . . . . .	\$4300		

## Caterpillar Tractor Co.

EXECUTIVE OFFICES: SAN LEANDRO, CALIFORNIA  
Sales Offices: Peoria, Illinois, 30 Church St., New York, San Leandro, Calif.  
Holt Combined Harvesters & Russell Road Machinery  
"Caterpillar" Tractors

# CATERPILLAR

REG. U.S. PAT. OFF.

# T R A C T O R

Do you mention the CONTRACTORS AND ENGINEERS MONTHLY when writing? Please do.



DISTANCE

WEATHER

SEASON

# Barriers broken...

Time and distance . . . season and weather. . . . such have been the barriers of transportation. Pioneer builders of American roads used equipment bearing our name, to break down the barriers of distance and time.

More recently we have set ourselves to overcome the barriers of season and weather. We have designed equipment with year 'round uses . . . equipment that operates under conditions of weather and soil that would halt or

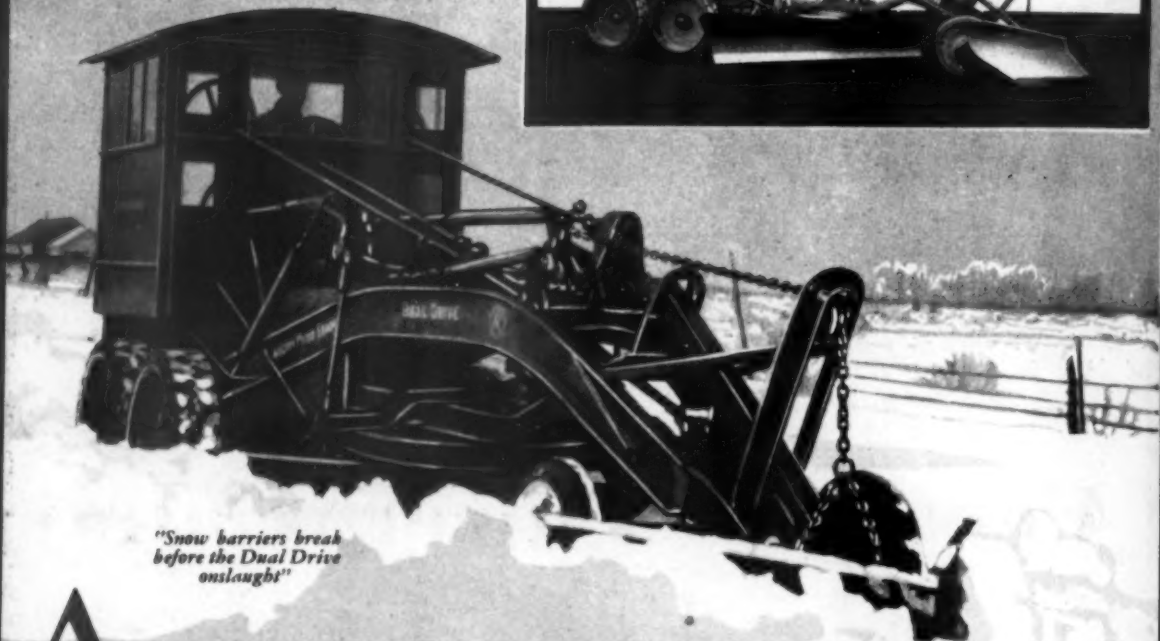
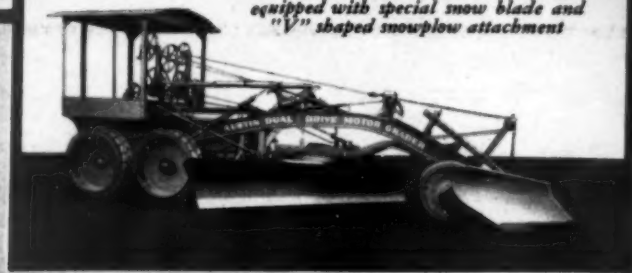
lower the efficiency of most machines. We have succeeded largely because every machine we manufacture is designed and built to meet and overcome definite road construction or maintenance problems.

With these barriers broken, Austin-Western Road Machinery performs a modern service to contractors and public officials and continues an old tradition. Wider usefulness at a minimum investment means better roads and improved transportation.

## Austin-Western ROAD MACHINERY



*The Austin Dual Drive Motor Grader equipped with special snow blade and "V" shaped snowplow attachment*



*"Snow barriers break before the Dual Drive onslaught"*

## Austin Dual Drive Motor Graders give year 'round service

Even in the snow belt, the Austin Dual Drive stays on the job twelve months of the year. Snow barriers break before the Dual Drive onslaught. Such year 'round utility reduces your capital investment in road maintenance equipment and lets your budget cover more ground.

### *Snow removal attachments for Dual Drive*

When equipped with special snow blades and "V" shaped snowplow attachments, Austin Dual Drive Motor Graders make excellent snow removal machines. The same extra margin of power and traction that makes these huskies leaders in the motor grader field gives them the edge on snow removal work.

The advantages of four drive wheels, when there are drifts to buck, are obvious. It is possible to maintain higher speeds. The chances of slipping and skidding are greatly reduced.

If you already have a Dual Drive Motor Grader you may widen its field of usefulness by having it equipped with snow removal attachments now. If you are considering the purchase of snow removal equipment, a Dual Drive would be an economy because you would get year 'round utility, instead of having an idle investment eight months of the year.

*Write for complete information*

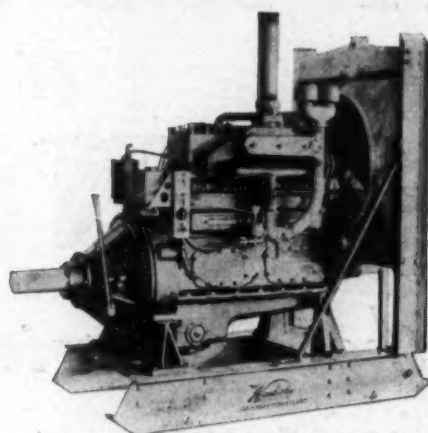
### **THE AUSTIN-WESTERN ROAD MACHINERY CO.**

400 North Michigan Avenue, CHICAGO, ILLINOIS—Branches in principal cities

Leaning Wheel Graders, Straight Wheel Graders, Motor Graders, Elevating Graders, Crawler Dump Wagons, Scarifiers, Rock Crushers, Portable Conveyors, Rollers, Motor Sweepers, Street Sweepers, Sprinklers, Road Oilers, Hot Patch Portable Asphalt Plants, Plows and Scrapers



*Climax R-4-U Paymaster Jr.  
Twin Disc Equipped*



*Waukesha WLS Stationary  
Twin Disc Equipped*

## Complete Power Units



### PARTS STATIONS

Boston, Mass.—Rapp-Huckins Co. Inc., 59 Haverhill St.  
Buffalo, N. Y.—Edward W. Rode, 45 A. St.  
Cleveland—Industrial Engine Parts, Inc., 1053 E. 61st St.  
Chicago—Motive Parts Co. of America, Inc., 2419 Indiana Ave.  
Des Moines—Motive Parts Co. of America, Inc., 1204 W. Grand Ave.  
Detroit—Whitney Brothers, 6464 Epworth Blvd.  
Fort Worth, Tex.—Fort Worth Wheel & Rim Co., 812 Throckmorton St.  
Houston, Tex.—Portable Rig Co., Inc.  
Los Angeles—Coast Machinery Corporation, 406 E. Third St.  
New York City—John Reiner & Company, Inc., 309 Church St.  
Philadelphia, Pa.—Maerky Machine Works, 240 Cherry St.  
Pittsburgh, Pa.—Motive Parts Co. of Pa., 6314 Penn. Ave.  
Raleigh N. C.—Motor & Equipment Co., 215 E. Davie St.  
San Francisco—F. Somers Peterson Co., 57 California St.  
Tulsa, Okla.—Buda Engine Service Co. of Tulsa, Inc.

**C**ERTAIN groups of industrial operations, now fairly well standardized, have created a market for completely equipped power units, each designed for a particular purpose.

One important feature of these units is the power take-off, which must meet all of the power and working conditions the unit is designed for.

It is significant that many of these complete power units are shown equipped with Twin Disc products. Twin Disc clutches, power take-offs and reduction gear units have been developed to meet practically all requirements.

Over 500 styles and sizes are now available, ranging in capacity from less than 1 to more than 400 H.P. per 100 R.P.M.

If you are interested in this recent development, or have use for clutches to meet any regular or special conditions, drop us a line. Our specialty is the solving of difficult clutch problems.

**TWIN DISC**  
CLUTCHES

**TWIN DISC CLUTCH COMPANY**

RACINE

WISCONSIN

# ANNOUNCING *a new* **1-TON TRUCK**

*at the lowest price<sup>\$</sup>  
ever put on a  
Dodge 1-ton truck*

# 745

A new Dodge Brothers Truck now takes its place in a line already unusually complete. It is typically Dodge in the way it will work and the way it will earn . . . a remarkable chassis value at \$745, the lowest price at which a Dodge 1-ton truck has ever sold.

Take a trial trip—with you at the wheel. Test it for speed, power, safety, driving ease and riding comfort. Lift the hood and inspect the sturdy, modern engine. Note the rugged frame, axles and springs. Give due importance to the quick, quiet, sure hydraulic 4-wheel brakes.

Let us show you the truck complete with body you need. Stand back and admire its good looks. Picture your name on its sides.

You can put one of these 1-ton trucks to work—safe in the knowledge that

## CHASSIS F. O. B. DETROIT

it will carry your loads dependably and at a surprisingly low cost per mile, per trip, per year.

Let us prove these statements. Have one of these exceptional workers join forces with your other business-building and profit-earning investments.

### PRICES

MERCHANTS EXPRESS—109' wheelbase (4-cyl.)	\$ 525
COMMERCIAL TRUCK—124' wheelbase (4-cyl.)	675
COMMERCIAL TRUCK—124' wheelbase (6-cyl.)	775
1-TON—133' wheelbase (4-cyl.)	745
1-TON—133' wheelbase (6-cyl.)	845
1-TON—140' wheelbase (6-cyl.) Heavy Duty	1065
1½-TON—150' wheelbase (6-cyl.)	1345
1½-TON—165' wheelbase (6-cyl.)	1415
2-TON—150' wheelbase (6-cyl.)	1515
2-TON—165' wheelbase (6-cyl.)	1585
3-TON—135' wheelbase (6-cyl.)	1745
3-TON—165' wheelbase (6-cyl.)	1775
3-TON—185' wheelbase (6-cyl.)	1845

*Chassis f. o. b. Detroit*

# DODGE BROTHERS TRUCKS



SOLD BY DODGE BROTHERS DEALERS EVERYWHERE

Do you mention the CONTRACTORS AND ENGINEERS MONTHLY when writing? Please do.



# CLETRAC

## CRAWLER TRACTORS

### The Winter Job!

**S**NOW clearance will soon supplant summer's maintenance work and in this modern day of heavy, year 'round traffic the job dare not be slighted. Drifted roads and snow-heaped streets are hazards to public welfare and killers of winter business that simply must be controlled.

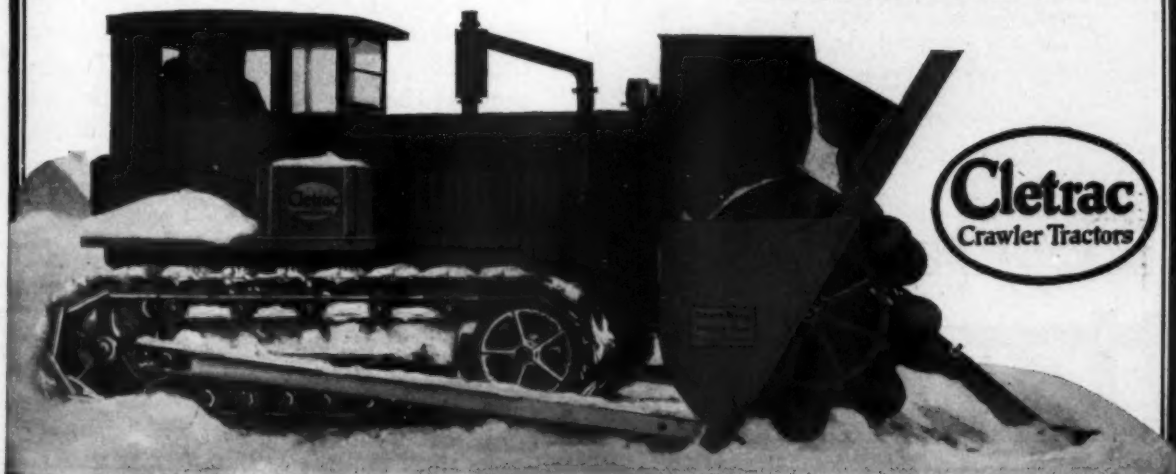
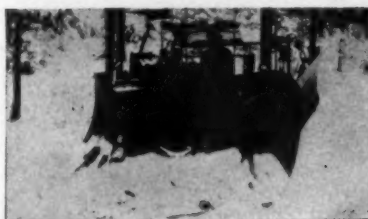
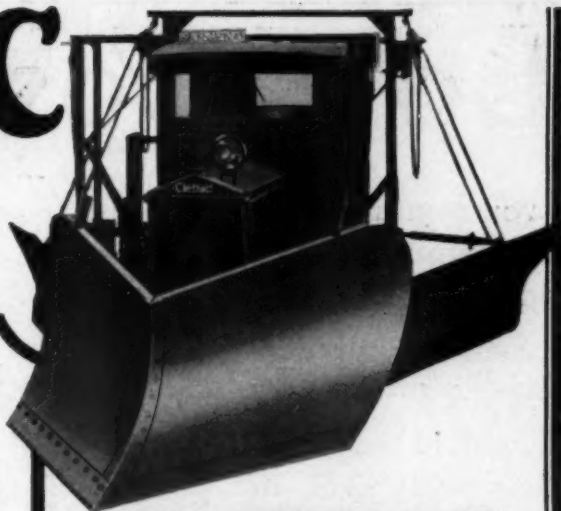
Throughout the snow belt you will find Cletrac Crawler Tractors foremost in the big job of snow removal, both out on the highways and on city streets. Their extraordinary power, positive traction and fast travel make them the perfect power units for this work. Practically every standard make of snow plow is designed specifically for use with Cletrac—ready for instant attachment at the first warning of "blizzard on the way."

*Write for the story of Cletrac and its heroic work in snow fighting.*

**THE CLEVELAND  
TRACTOR CO.**

19321 Euclid Ave.

Cleveland, Ohio



When writing advertisers please mention the CONTRACTORS AND ENGINEERS MONTHLY—Thank You.

# Low Cost Grading

...on anything from  
a skimming cut to a  
4-foot bank

...without prelim-  
inary plowing

...and in anything  
that will yield to  
pick and shovel

...earth, sand, clay;  
gumbo, old maca-  
dam, top soil, etc.



## Airports for instance!

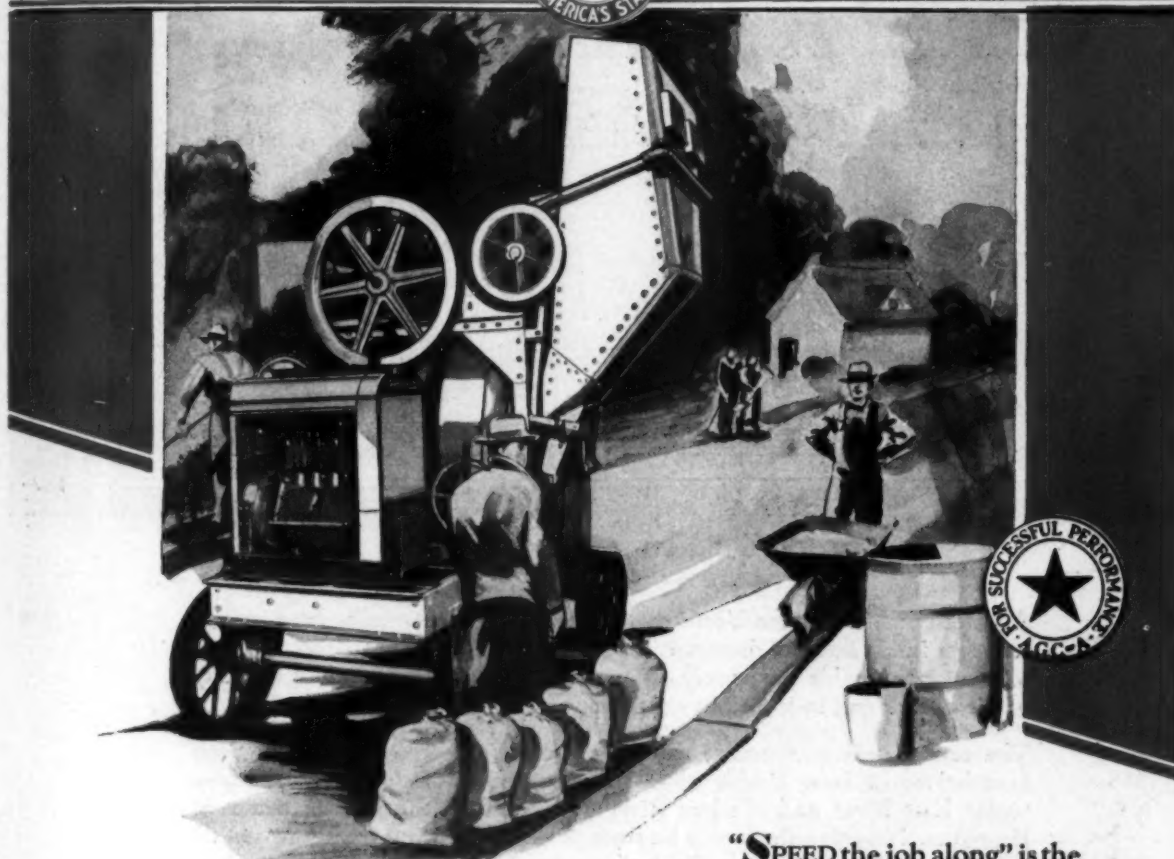
You can shallow-grade at much lower cost with the new **HAISS EXCAVATOR**. It is a continuous digging machine that makes a cut 8 feet wide in a single pass—and will excavate up to 2 yards a minute depending on the depth of cut. To appreciate this machine, what it can do and what you can save by using it, you ought to write us—

*"Send along your Haiss Ex-  
cavator performance book"*

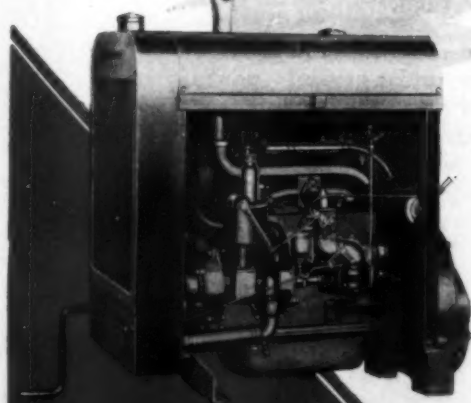
**George Haiss Mfg. Co., Inc.**  
142nd Street and Park Avenue New York City

# HAISS "EXCAVATOR"

# Dependable Power for Every Purpose



"**SPEED** the job along" is the cry of the boss. Delays are too expensive to countenance in road building. ¶ Among the many road building jobs where Heavy Duty Continental Engines lead the way to profits a significant number is located in Southern California. The T. L. Smith Co. 10S Mixer shown above is powered with a Heavy Duty Continental Engine applied by Brown Bevis Co. as assurance of profitable power dependability under all conditions.



**CONTINENTAL MOTORS CORPORATION**

INDUSTRIAL EQUIPMENT DIVISION

Office and Factory: Muskegon, Michigan

The Largest Exclusive Motor Manufacturer in the World

# Continental Engines

When writing advertisers please mention the CONTRACTORS AND ENGINEERS MONTHLY—Thank You.





## THE JOB

A water conduit between Yonkers and Brooklyn twenty miles long, seventeen feet inside finished diameter, and eight hundred feet deep through solid rock to double the supply of pure Catskill water throughout the City of New York and to insure its continuous flow.

The tunnel will pass under the rapid transit subways—under the deep foundations of New York's huge sky scrapers—under railroad tunnels—under East River and Harlem River and come to the surface again in Brooklyn. Nineteen shafts will be sunk to depths varying from 500 to 800 feet. Three thousand men will work nearly six years to complete the job.

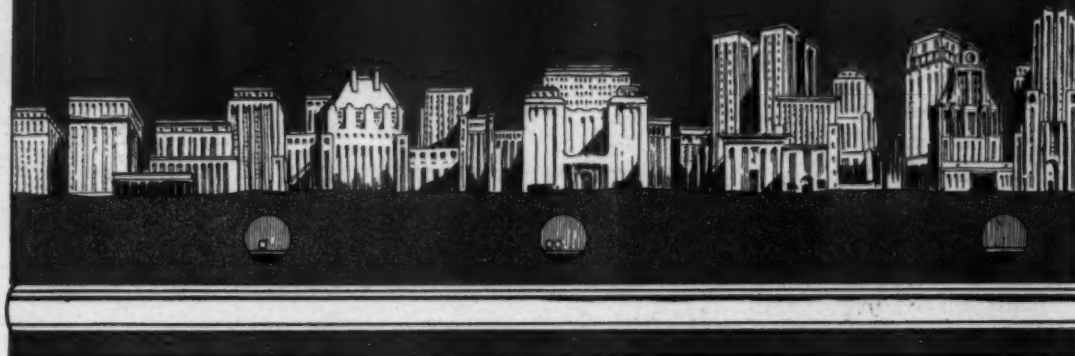
Special machinery has been designed to meet individual working conditions—machinery that must be dismantled, lowered down the shafts, and reassembled under ground—machinery that dare not fail.

Power shovels were needed that could meet the conditions found when working in a nineteen foot tube hundreds of feet under ground—power shovels requiring a minimum of maintenance and capable of twenty-four hour day-in-day-out service over a period of years. Many designs were offered, but it remained for Osgood engineers, with more than half a century of continuous experience designing excavating machinery, to build the machines that met McGovern's exacting requirements.

# RECORD ~

AT ONE TIME BY ONE COMPANY  
..... OSGOODS, OF COURSE!

# SUPERIORITY WINS!



## THE MEN

**Organized Ability, Past Performance, and Capacity for Handling Vast Projects Successfully Placed the Job in the Hands of —**

**PATRICK MCGOVERN**—the man who masters seemingly impossible engineering problems—and work has started on a tunnel twenty-two miles long that will double the supply of pure water for New York City's six million.

Thirty-eight years ago, Pat McGovern—a brawny lad having an uncanny knack with a pick—left County Cavan in North Ireland and came to America. Landing 'broke' he immediately got a job as a day laborer at \$1.75 a day. He has been working every since, and has just recently won the contract for his latest big job—a forty-two million dollar project.

**AND**

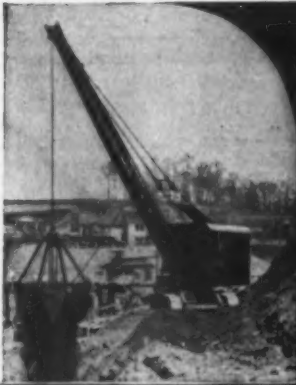
**JOHN S. MACDONALD**, youngest chief engineer and tunnel specialist, worked for McGovern during his vacations at Dartmouth and ever since his graduation in 1913.

He was engineer on the New York Barge Canal, Fort Point Channel Tunnel at Boston, Twin Tunnels under East River at New York, 14th Street Subway System at New York, and the Causeway Bridge over Jamaica Bay, New York.

He was chief engineer on the twenty-six million dollar subway section in Philadelphia, the 53rd Street Tunnel in New York, and now as a crown to his many engineering monuments, he—as Vice President of the McGovern interests—will be chief engineer on this huge project.

# A WORLD'S

## TWENTY-TWO SHOVELS BOUGHT AND FOR ONE JOB .....



Universal-35 operated as a clamshell by Reed and Abee, Inc., on the \$200,000 sewer contract for the \$10,000,000 rayon plant of the American Enka Corporation, Asheville, N.C.

# The 1/2 Yd. UNIVERSAL-35

Crane—clamshell—dragline—shovel  
—skimmer scoop—backdigger

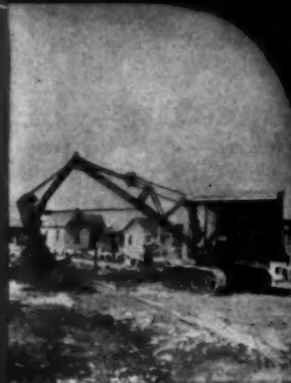
*Mounted on the famous 2 Speed Center Drive Crawler.*



On shallow basement excavating, handling shale and loam, this Universal-35 shovel loads as high as 400 trucks in 10 hours, averaging 6 passes per truck load.

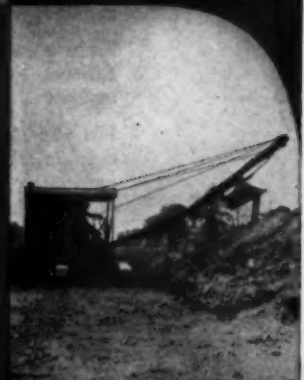
You can change the boom equipment at any time, to the most efficient type for the immediate job at hand. Hence it's the easiest thing in the world to keep a Universal-35 busy.

THE UNIVERSAL CRANE CO.  
Lorain, Ohio



The Universal-35 skimmer scoop with a cutting stroke of 11 1/2 feet, holds a smooth level grade. This machine has the same superstructure as the Universal-35 shovel or crane.

With backdigger boom this machine is excavating for 24" sewer tile. When the excavation is completed, the machine may be quickly changed over to a crane for lowering the pipe.



# UNIVERSAL-35

Do you mention the CONTRACTORS AND ENGINEERS MONTHLY when writing? Please do.



# 15,240 GALLONS per HOUR

## at 5 FOOT HEAD



### DRAINS

Manholes, Basements, Sewers, Quarries, Sumps, Tanks, Ditches, Trenches, Troughs, Excavations, Cisterns, Pest Cesspools, etc.

### FILLS

Boilers, Tank Cars, Pavers, Oil Burner Tanks Requiring Underground Testing, Outdoor Swimming Pools, etc.

### FLOODS

Skating Rinks, Irrigation Ditches and Large Areas on which growing produce is in need of moist ground, etc.

#### CAPACITIES

Head in Feet	Gallons Per Hour	R.P.M.
5	15240	2150
10	14100	2200
15	12960	2250
20	11820	2300
25	10620	2350
30	9480	2400
35	8280	2450
40	7140	2500
45	6000	2600
50	4800	2650
55	3360	2700

**\$180<sup>00</sup>**  
**F.O.B.**  
**FACTORY**

**A** NEW model Centrifugal Portable Pump, by Evinrude—the pioneer portable pump builder since 1915!

A new model into which is built 14 years of manufacturing and engineering experience—years of “knowing how.”

A new model which is millions of gallons beyond experiment, because scores of them have already been out in the field for months.

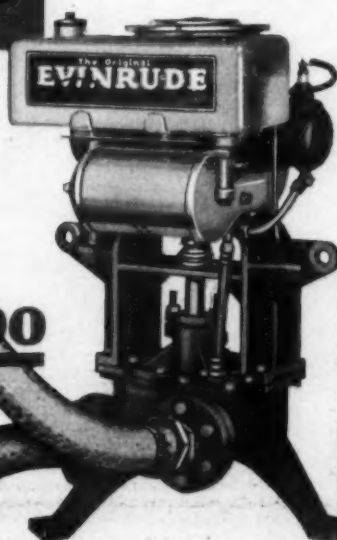
A new model of 140% greater capacity than its popular predecessor, yet 10 lbs. lighter and 11% more compact.

A new model of 6 horsepower instead of 2 horsepower, and two-cylinder instead of one.

A new model, eight times more efficient than the ordinary diaphragm pump. And in the portable power pump field, priced at just about one-half its real competitive value on the basis of gallons per hour.

*Mail the Coupon for Catalog and FREE Demonstration.*

**EVINRUDE DIVISION, Outboard Motors Corp.**  
 MILWAUKEE, WISCONSIN



**CENTRIFUGAL**  
**EVINRUDE**  
**PORTABLE PUMP**

EVINRUDE DIVISION,  
 3901-27th Street, Milwaukee, Wis.

Gentlemen: Send complete catalog on Centrifugal Portable Pump and name of nearby distributor who can demonstrate.

Name.....

City.....

State.....

5

## MONARCH Tractors Help Move Over 300,000 Yards of Dirt in Record Time!

**H**AULING two heaping full 7-yd. wagons at a crack, up steep grades, thru deep mud and over soft soil, is proof aplenty of Allis-Chalmers Monarch's super-power. And they're proving it every day with five Monarch "75's" on the Lotawana Dam project, near Kansas City, Mo. The average rate of dirt is being moved at the average rate of about 1450 cu. yds. a day—and the average haul is 1400 ft. During dry weather the yardage leaped to 2500 a day. The Martin Day Co., of Lincoln, Nebr., is the contractor.

After all, it's performance that counts—Monarchs are making a big hit on jobs the country over. Operators like the easy steering and the clear view ahead that Monarchs give them.

Let us tell you how Monarchs are cutting costs on all kinds of jobs. Let us show you things you've always wanted in a tractor that are now available in the Allis-Chalmers Monarch. Drop us a line today—for prices and complete information.

**ALLIS-CHALMERS MANUFACTURING CO.**  
Specialists in Power Machinery Since 1846  
MONARCH TRACTORS DIVISION  
SPRINGFIELD, ILL.

Allis-Chalmers  
**Monarch**  
Tractor





1 1/2-Bag Semi-Trailer  
Spring-Mounted Mixer

### For High Grade Equipment With Endurance Built Into It—Buy "Lausons"

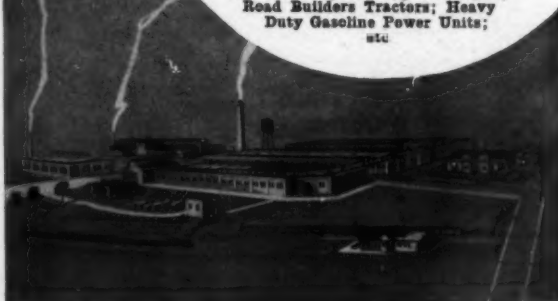
Made by an Organization with  
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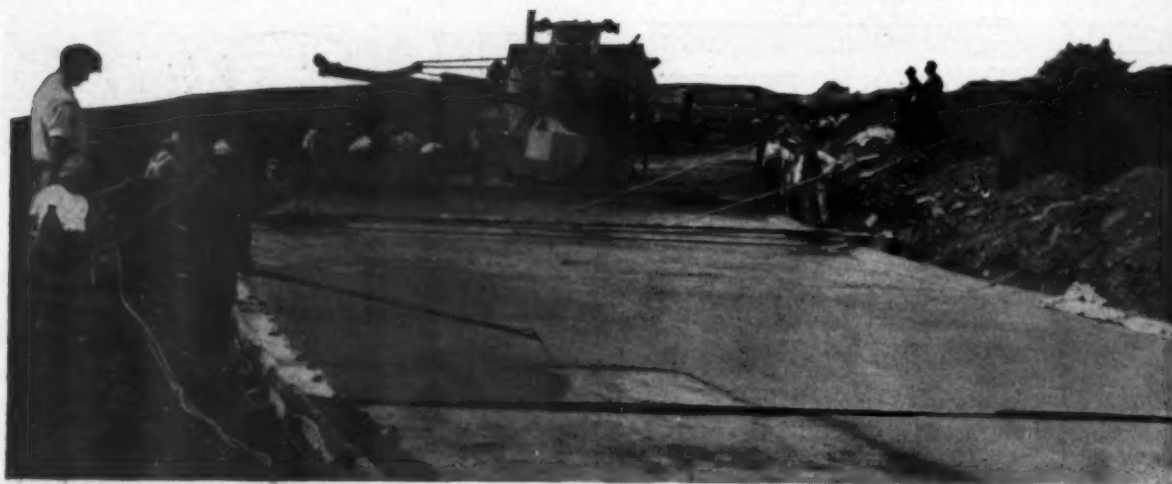
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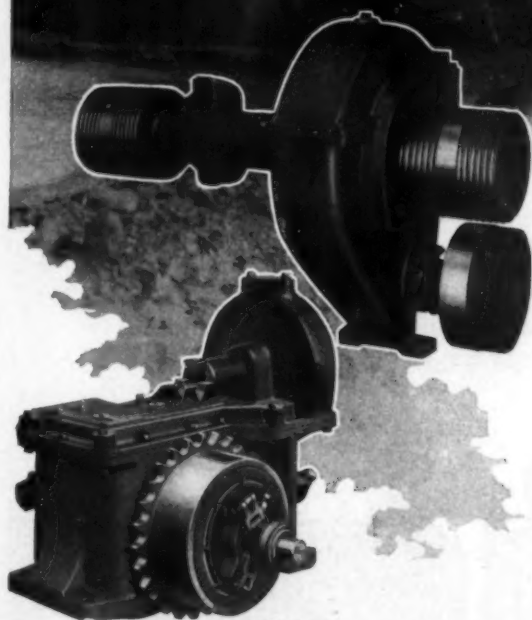
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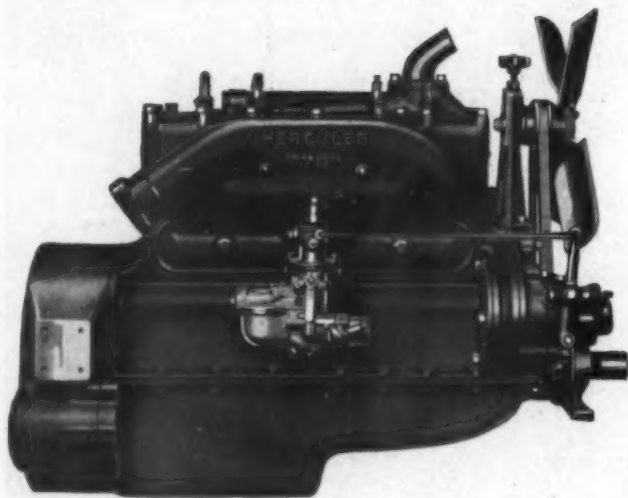
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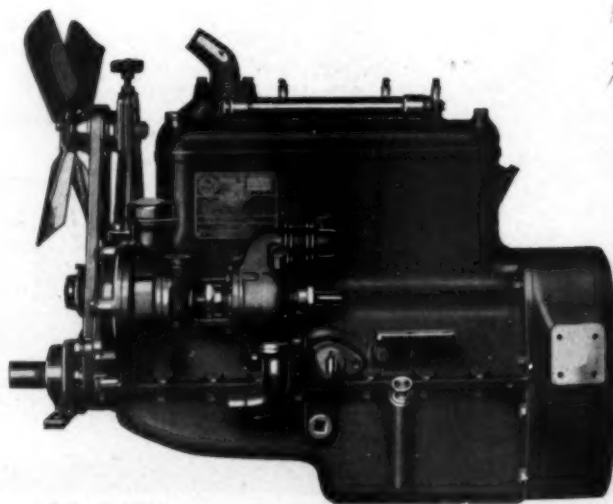
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### SPECIFICATIONS

Model	No. of Cyl.	Bore	Stroke
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OOB	4	3¾"	4½"
OOC	4	4"	4½"

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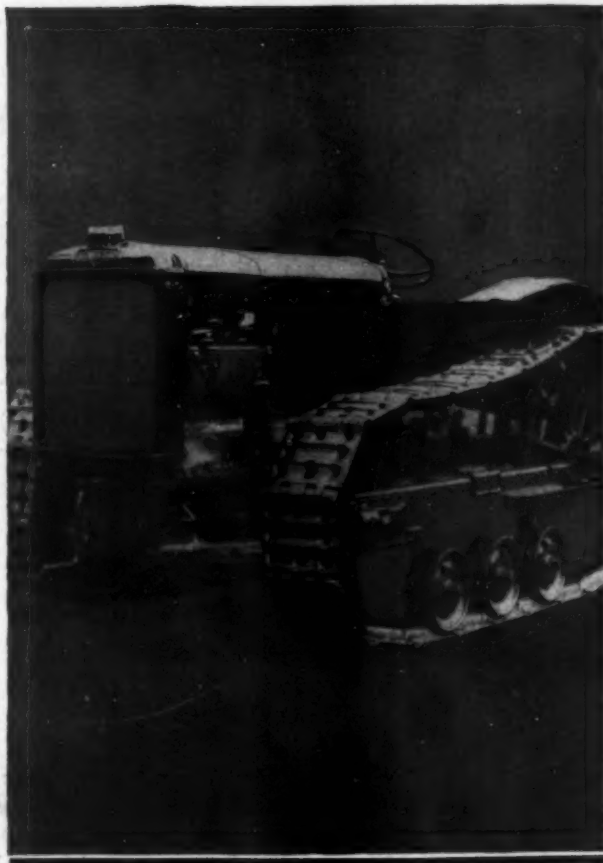
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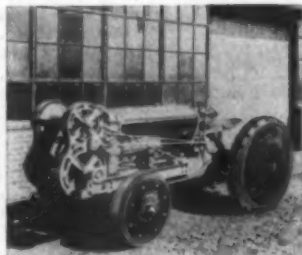
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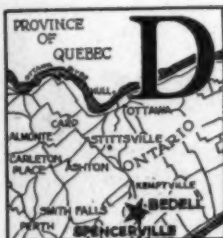
Vol. XIX  
No. 3

# Contractors *and* Engineers Monthly

September,  
1929

## Attention to Detail on Hot Mix Plant Set Up

*Temporary Plant of Rayner Construction Ltd.,  
as Complete As Though Permanent  
With Exceptional Layout*



IESEL power for the operation of the crusher and mixing plant is a novelty in the hot mix field. The Rayner Construction, Ltd., Toronto, Ont., made use of this economical prime mover on its asphaltic concrete plant for an 11.7-mile job last summer between Bevell and Spencerville, Ont.

The thought of a hot mix plant usually brings to mind heterogeneous gathering of equipment which is laid out more or less effectively as long as it gets the hot mix out satisfactorily. The Rayner plant was laid out with a neatness and compactness that would make it a model for many a day to come. Instead of the litter and asphalt-covered machinery one is accustomed to see everything was clean throughout the job.

### PRODUCTION OF AGGREGATES

The contract for this work was awarded the middle of March, 1929, and stripping operations began April 22. The pit for the coarse and fine aggregate was located immediately in front of the mixing plant, and was particularly good in that the proportion of coarse and fine material was about correct when the material had been run through the crusher, there being a slight excess of fines. The 2 to 3 feet of stripping necessary to open the pit for use was used along the road for shoulder backfill for the forms. A Bucyrus-Erie Type 2B steam shovel with operator, foreman and a pit man handled all the aggregate for the job.

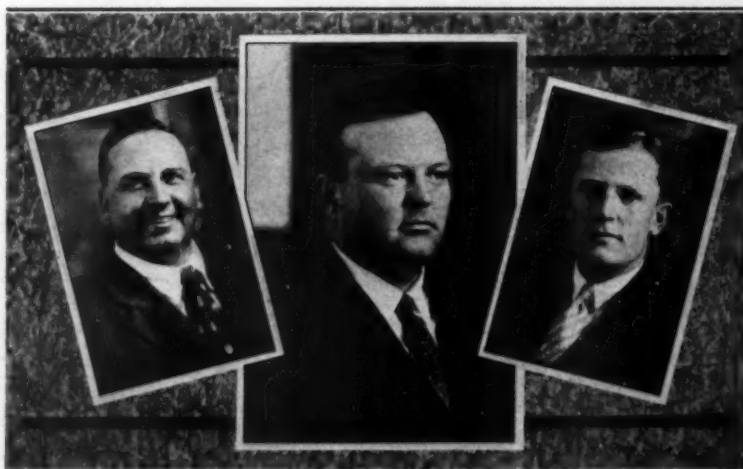
The shovel loaded the trucks on top of the bank, thus saving much time in loading. A 10-ton stiffleg derrick with a Marshe-Henthorne 10 x 12 hoist and

a Dake swinging engine and an Owen 1-yard clamshell also handled loose material to the trucks.

### CRUSHING PLANT

A substantial ramp was built with a platform of sufficient size for the trucks to drive up, cramp the wheels and back to the rail screen shown on the diagram. The edges of the ramp were curbed with large birch logs for safety. The rail screen to let the fines through was made of 20-pound rails with the flanges burned off and spaced with pipe bushings. The coarse material went down the screen to the Allis-Chalmers Gates No. 6 gyratory crusher which had a side discharge to the bucket elevator which also handled the fines from the rail screen. The platform had stairs so that it was not necessary for anyone leaving the screen to walk into the path of a truck coming up or leaving the platform.

The elevator raised the crushed material to a triple



OFFICIALS RESPONSIBLE FOR THE SUCCESSFUL COMPLETION OF  
THE BEVELL-SPENCERVILLE ASPHALTIC CONCRETE HIGHWAY  
Left, S. E. Paisley, Chief Government Inspector. Center, T. S. Woodyatt,  
Superintendent, Rayner Construction Ltd. Right W. J. Latimer, Plant Inspector





*The Fleet That Handled the Hot Mix from the Plant to the Job*

deck shaker screen. All stone over  $1\frac{1}{2}$ -inch went to the oversize bin which overflowed to the crusher. In this way a supply of larger stone was maintained for use on the subgrade as needed. Stone passing the  $1\frac{1}{2}$ -inch screen and retained on the  $\frac{1}{2}$ -inch screen went directly to the stock pile. Stone passing the  $\frac{1}{2}$ -inch screen and retained on the  $\frac{1}{4}$ -inch screen went to the second section of the bin and overflowed to the stockpile. All stone which passed the  $\frac{1}{4}$ -inch screen went directly outside to the open storage. The stone which went to the open storage or stock pile was held from spreading in the direction of the drier by a barricade of small birch logs with a gate at the bottom permitting control of the flow to the elevator to the drier.

The platforms around the stone bins and the screens were completely equipped with hand rails and stairs instead of the all-to-frequent crudely made ladders. This is an important contribution to the morale of the men who are thus unconsciously enabled to give more of their thought to the operation of the plant and less to their immediate safety. Throughout the entire organization on this job there was a spirit of cooperation everywhere from the laborers on the road to the superintendent. The plant and road crews worked throughout daylight which was from 4 in the morning to as late as 9:30 at night. The Italian hot mix crew on the road was noted for its singing which could be heard for a quarter of a mile when they were returning at night in the truck after putting in the entire day on the road. Foremen and truckmen all had the complete confidence of the superintendent and were able to use their own initiative to a remark-

able degree to see that their part of the work progressed satisfactorily.

It was this remarkable morale that minimized the shutdowns on the road and made such production as 1,200 tons of gravel from the pit a day, 300 yards of fill, 50 tons of hot mix per hour from the plant, and a mile a week of hot mix pavement laid with the comparatively small organization employed.



*One of the Insulated Asphalt Trucks Which Hauled Hot Asphalt from Bedell to the Plant*

#### THE HOT MIX PLANT

A small bucket elevator raised the stone and fines from the gate at the barricade to the rotary drier which was 26 feet long and had an oil flame entering at the discharge end. The drier was equipped with a dust catcher to prevent the loss of the very finest material but this was not used to any extent on this particular job. The drier and mixing plant were built by the General Supply Co., of Ottawa. The dried sand and gravel was delivered at the low end of the drier to the enclosed hot sand elevator which raised it to the hot sand bin. A segregating screen in the bin divided the aggregate into two classifications which were used separately as necessary. The aggregates were weighed in a hopper immediately below the bins and the flow controlled by gates. A single batch of hot mix material consisted of 1,200 pounds of stone and 65 pounds of asphalt at the start of the work and as the demand on the plant was greater the batch was increased to 1,500 pounds of stone and 82 pounds of asphalt.

Imperial Oil Co., asphalt was received at Bedell in tank cars and trucked to the plant in two White trucks with 800-Imperial gallon tanks. The siding was equipped with a steam boiler for heating the asphalt



*The Anderson Diesel Engine Which Operated the Hot Mix Plant*

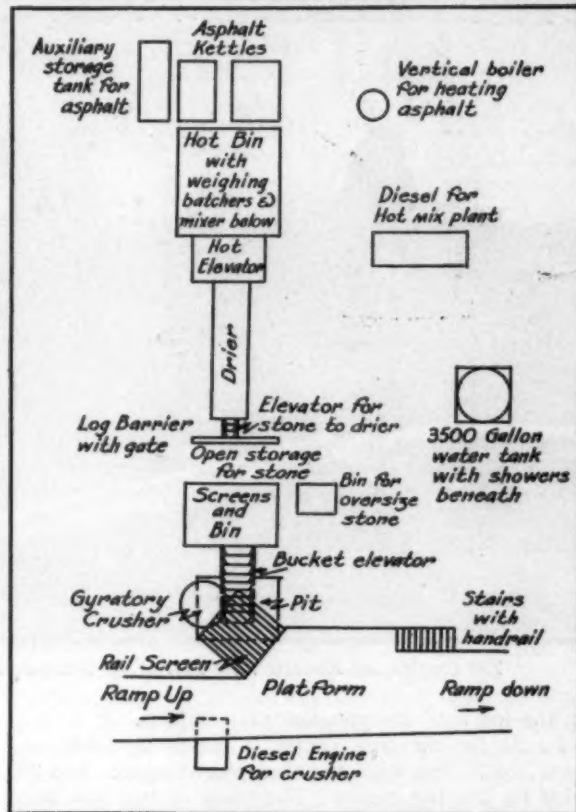
before withdrawal to the trucks. The asphalt was delivered to storage at the plant. There were 2 asphalt kettles mounted on wheels and set up on concrete foundations, these kettles each having a capacity of 15 tons. In addition a 10,000-gallon tank was used for auxiliary storage and a supply of 90 tons of asphalt in drums was always at hand in case of failure of the supply by rail. Both kettles and the tank were heated with steam from two locomotive type boilers. The steam was trapped and condensation run off. The kettles and storage tank were so piped that it was possible to draw from any one or any combination of the three. The asphalt had a penetration of 71-81, and was pumped by a Westinghouse Air Brake Co., air pump from storage to the weighing kettle. The asphalt and aggregates were well mixed in the pug mill before discharge to the waiting truck or to the steel-lined cypress box with rack and pinion door which held 6 tons of mix. This acted as storage when no truck was waiting and also reduced the time a truck stopped at the plant for its load to a minimum.

A fleet of 6 Stewart trucks handled the batches from the plant to the road job. As the trucks arrived at the plant they were swabbed out with fuel oil before loading with the 9 batches. The hauling of batches was entirely by subcontract with individual truck owners on a tonnage basis for haul to six areas into which the job was divided.

#### ORGANIZATION ON THE ROAD

As the trucks pulled out from the plant they were weighed on a Fairbanks-Morse dial scale with a device that permitted the tare weight to be set on the scale and the net weight read directly on the dial. This 15-ton scale was operated by an inspector of the Department of Highways and the weights read were used in the payment of the subcontractors for hauling and in paying the Rayner Construction, Ltd., for the quantity of hot mix placed on the road.

The trucks were turned on the road on a Blaw-Knox



Layout of Hot Mix Plant of Rayner Construction, Ltd., on Bedell-Spencerville, Ont., Road

turntable and then backed to the spreaders made by the contractor and the hot mix laid out on the road. The gang consisted of 4 rakers, 4 shovelers, 1 box man and a laborer. The mix was immediately rolled by three 12-ton Waterous 3-wheel steam rollers maintained



The Drier, Hot Elevator and Bins, Mixing Plant With Diesel Engines Operating It, and at Extreme Right, the Asphalt Storage Tanks



*The Crusher and Elevator With Derrick for Handling Excess Aggregate at Left and Fuel Oil Tank at Right*

on the job until compression was complete.

Forms for the base course, 3 inches in thickness, were laid 21 feet wide and then picked up and laid 20 wide for the top course. The value of this was that there was not a vertical wall 6 inches high to break down under traffic but rather two layers of 3 inches each which would more likely stand up when back-filled with the shoulder material. The forms were 3 x 6-inch screeds with holes for the steel pins bored at each end. No pins were used at the center as the forms were well backfilled as laid and the base was well rolled before the forms were put down. About 1 mile of forms was laid ahead of the spreading.

#### SHOULDERS

The shoulders for the road were cut back by hand on a 1:1½ slope and the same for the back slope. Where blow sand was encountered the slope is 3:1.



*The Road Crew That Worked from Daylight to Darkness and Came in to Camp Singing as Though Spreading and Raking Hot Mix Was a Picnic*

#### WATER SUPPLY

The water supply for the camp and the boilers was secured from a spring that was struck when the pit for the crusher and bucket elevator was dug. Before this source was found a 6-inch driven well 36 feet deep had been prepared to insure water for the job. This well was not used throughout the work. Water from the spring was pumped to a 3,500-gallon wooden tank mounted over a house in which hot and cold showers were available for the men at all times of day or night. Water from the spring was used for all the equipment thus making it necessary to use one type of boiler compound on all steam boilers. The tank truck maintained at the plant was used to distribute water to all the equipment throughout the job other than those supplied by gravity.

#### FUEL OIL SUPPLY

The Anderson diesel oil engines that operated the crusher and the hot mix plant were supplied with oil from a 10,000-gallon fuel oil tank. This tank was filled by trucks hauling from the railroad siding at Bedell.

#### CONSTRUCTION CAMP

A construction plant was maintained for the 100 men employed on this project. The individual bunk houses were built up of 6-foot sections bolted together and furnished quarters complying with Ontario Department of Health regulations, which require 400 cubic feet of air space per man. A clean mess house with a large refrigerator was maintained where the men could secure their meals for 40 cents each or a dollar a day. A small general store and stock house was established, where the men could buy small articles for toilet use and smoking practically at cost, and the stock house was kept by the same man with a minimum of red tape, but with a

*(Continued on page 76)*



# Road Work Near East End of Long Island

*One of Many Concrete Roads Being Built for Heavy Traffic from Metropolitan New York to Playground Area by State Department of Public Works*



LONG ISLAND, said by its ardent admirers to have a population which, if it were a state by itself would make it the fifth most populous state in the Union, is the scene of many interesting construction projects each year. At the extreme eastern tip of the island is a vast realty development which will attract literally thousands of people in another year or two and yet will in no way be crowded. To care for the increasing traffic to the east end of the island at Montauk Point, the New York State Department of Public Works is rebuilding the Bridgehampton-Southampton stretch of New York State Route 27 under contract 1789 awarded to the Northport Sand & Gravel Co., Northport, L. I.

The contractor made very fair progress with well-chosen equipment in spite of some minor labor troubles in the district. The contract called for 4.06 miles of 8-inch uniform reinforced concrete pavement built in three 10-foot strips.

The job was let on September 13, 1928, and concreting started early in October, 1928, and continued until about the middle of December. The contract calls for completion of the project in 150 working days.

## CENTRAL PROPORTIONING PLANT

Stone for this project was delivered at the site of the batcher plant last winter at Water Mill Station, located at about the middle of the job, but because of the inferior quality of part of the delivery it was

rejected. Following rejection, stone was delivered by railroad, unloaded by a P & H-600 crane to the Blaw-Knox steel bins and batcher. Sand was also delivered and unloaded to the bins or stock pile in the same manner.

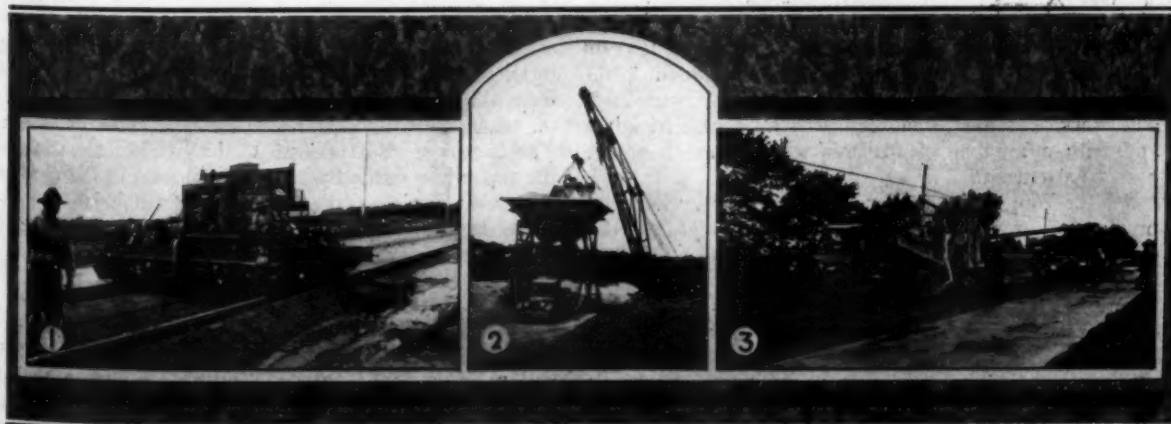
The fleet of trucks backed under the bins receiving the load of crushed stone, then ran forward about 100 feet to the cement shed where 8 bagfuls of cement were emptied and then the trucks proceeded forward for a short distance and again backed under the batches. This caused some delay in dispatching the trucks.

The crew at the unloading plant consisted of five men in the cement shed, one on the crane and one on the batcher plant.

The 8 bags of cement for the batch were brought out of the cement shed on hand trucks, the ties cut and then one or two men passed the bags out to one man standing in each batch compartment on the truck who emptied the Lehigh cement on the stone.

## FINE GRADING AND FORM SETTING

The Blaw-Knox forms were set and straightened by a crew consisting of a foreman, two form setters with three helpers, an oiler and two men who straightened up the forms behind the Nu-Method finish grader. The finish grader ran on channels formed by riveting two 3-inch angle irons together and laid over the roads forms. Because of the weight of the machine and the vibration caused by cutting the subgrade, there was liable to be some displacement of forms, particularly at joints, so the channels were used to reinforce the forms and then the crew of two men touched up the alignment as needed.



OPERATIONS ON THE SOUTHAMPTON-BRIDGEHAMPTON ROAD, LONG ISLAND, N. Y.

1. Nu-Method finish grader which planes the subgrade to the right point and delivers excess dirt over the forms to the shoulder.
2. P & H Model 600 crane loading Blaw-Knox batcher. Autocar truck awaiting load under batcher.
3. Mack truck delivering batch to Koehring paver.

In addition to the form setting crew there was one man on the Buffalo-Springfield 10-ton machine rolling the subgrade ahead of the finish grader, and two men on the finish grader itself.

#### CONCRETING OPERATIONS

The fleet of seven trucks which hauled the batches from the unloading plant to the paver was made up of four large Autocars, one small Autocar, one Graham truck, all owned by the contractor and one Mack truck which was hired. The trucks pulled up along the shoulders and entered the subgrade through a breach in the forms. The concreting crew consisted of one man dumping trucks at the paver skip, one man operating the 27-E Koehring paver, one on the Ord mechanical finisher and two hand finishers. Two men were also used spreading hay and two on sprinkling for curing. The job was equipped with Carbic flares to give adequate illumination for finishing after sunset.

#### PERSONNEL

This 4.06-mile project was constructed for the New York State Department of Public Works under the direction of J. J. Darcy, Resident Engineer, with A. Cass as engineer in charge. Thomas Gilman was Superintendent for the Northport Sand & Gravel Co., contractors, Northport, L. I.

### Building Construction

**A** NEW book in the construction field, entitled "Building Construction" and written by Whitney Clark Huntington, C.E., Professor of Civil Engineering at the University of Illinois, has recently been published by John Wiley & Sons, Inc., New York. The purpose of this book as stated in the preface by the author is to describe the types of construction used for the various parts of buildings, the materials used in building construction, the methods used in estimating the cost of buildings and cost keeping.

The first chapter is given over to a general survey of the building industry, its present trends and tendencies, the classification and general requirements for buildings and the various loads carried by buildings. This is followed by a rather more detailed discussion of the types of building materials, footings and foundations, masonry construction, structural elements, frame, ordinary and slow-burning construction, steel construction; reinforced concrete, floor construction, surfaces and many other parts of buildings, paints and pigments.

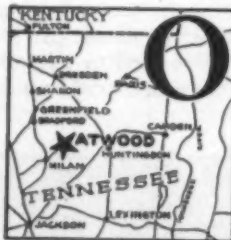
The last few chapters are taken up with a discussion of plans, specifications, contracts, bonds and insurance and considerable detail in the matter of cost keeping, time schedules, progress charts and cost charts as well as cost estimating.

The book covers the building construction field, being intended for students and those engaged as architectural draftsmen, inspectors and superintendents. Particular attention has been paid to the terminology used in building construction, most of the terms in common use being defined and illustrated.

The price of the book is \$6.00.

## Organization of a Tennessee Highway Contractor

*Well-Equipped Outfit Averages 1,000 Feet Per Day  
of Standard Tennessee 8-6-8 Pavement  
With 1,637 Feet As Best Day*



**O**n a 20.7-mile project, W. R. Aldrich & Co., Dyersburg, Tenn., averaged 1,000 feet of standard 8-6-8-inch concrete pavement 18 feet wide throughout its contract. The best run was 1,637 feet in one day and the best week that of July 15 during which 7,000 feet of pavement was laid.

The work was well organized with no excess of labor and with a number of features which, though small, deserve attention.

All the rough grading for this project was done the previous year under another contract including the drainage structures. This procedure permits all fills to settle and the grade to become stabilized over culverts before any attempt is made to pave. The paving contract was awarded to W. R. Aldrich & Co., early in April, 1929, and fine grading started May 16 with the paver following two days later.

#### UNLOADING AND BATCHING PLANT

The unloading and batching plant was located at Atwood at about the mid point of the work and a fleet of 15 to 35 Ford and Chevrolet trucks equipped with

Anthony dump bodies used to haul the average five miles to the paver. A spur track at the Atwood station gave a very good central location for the plant with the garage about 500 yards away. A Koehring crane with an Owen bucket was used to unload the gondola cars to the Heltzel portable bin equipped with Blaw-Knox weighing batchers. The trucks backed under the batchers for the 1-batch load and then drove about 200 feet to the cement car where the 6 bags were loaded direct from the car, subject to checking by the State inspector when the bags were found running short in weight. The bags were not opened at the car but tossed onto the top of the batch by one of the 4 men in the cement car crew. The operating force at the batcher was composed of the crane operator, 2 men in the car and 1 man on the batcher.

#### FINE GRADING

The surface placed on the road temporarily the previous year had compacted so well under traffic that it had to be loosened with a Western road plow hauled by a Caterpillar Thirty. The clay gravel surface when dry was a real tough pull and made hard work for the man handling the plow. The same two operators were used on the Galion No. 10 grader and tractor for blading the grade to approximate shape. After the blading



**FOLLOWING THROUGH WITH ALDRICH & CO., ON THEIR ATWOOD, TENN., HIGHWAY PAVING PROJECT**

1. The unloading and batching plant at the Atwood station. 2. Ford one-batch truck delivering a load to the ship of the Koehring 1929 paver. 3. The 10-foot and 14-foot twin bridges used for longitudinal floating of the pavement surface. 4. Laying the burlap from the rolling bridge. The burlap strips were 10 x 20 feet and were handled by four men.

the grade was rolled with an Austin 10-ton gas roller and then the Carr formgrader gave the true line for the forms to be set. Following the Carr machine there were two 2-up mule teams with fresnos removing the dirt thrown up from the trench. This was removed before the forms were set. Where there were high spots in the grade a Carr scarifier was used with another Caterpillar Thirty to loosen the top. This was followed by the Lakewood subgrader and fresnos and 2 hand shovel men to clean up.

**FORM SETTING**

The forms were set by 1 foreman and 4 helpers about 300 feet ahead of the paver. Heltzel forms were used on the job throughout. Behind the Blaw-Knox turntable and after the sprinkling of the subgrade a Fordson with loaded wheels was used to roll the subgrade to final shape and compaction. At a point about 100 feet ahead of the paver this was checked with a special template made by the contractor. The template is made of 2 x 12 timber cut to the exact parabolic shape of the final subgrade as required by the specifications and then is protected on each side by strap iron running the full length of the template and about 2 inches wide. This was used by the roller man and the man who sprinkled the subgrade to be sure of the shape. The template is made to give a grade about  $\frac{1}{4}$ -inch high so that the planer

on the paver will have some material to work on and to use in filling the low spots caused by the trucks. The contractor used one-batch trucks exclusively, although two-batch trucks are allowed, because he feels that the subgrade is kept in much better condition by the smaller and lighter trucks.

**CONCRETING METHODS**

The bags of cement on the trucks were emptied by two men who stood on a platform ahead of the turntable. There were 3 men who filled in the low spots in the subgrade shown by the template and who painted the forms by hand.

The water supply was furnished by 2 Barnes pumps which were moved ahead successively from one stream to another as the job progressed to keep down the pump pressure needed to supply the paver and the water for sprinkling. A C. H. & E. pump was purchased second hand to set ahead when needed. Pipe  $2\frac{1}{2}$  inches in diameter was used with the taps every 360 feet.

Two men were used at the paver to dump the trucks and handle the hose for the paver. There were 2 operators for the Koehring 27-E machine. The contractor feels that it is a real economy to carry two experienced paver operators on the payroll as insurance against illness. He has found that the second man is worth while



as a general handy man on mechanical troubles all over the job and thus he has paid his way.

A Koehring planer was attached to the paver and 2 men were used to shovel out the excess earth picked up by the planer. Two men were used to shovel concrete as spread on the subgrade by the paver bucket, 1 man was used to set the Truscon center steel and 1 man operated the Ord finisher. Two twin bridges one 10 feet and one 14 feet between bridges were used behind the finisher and were used alternately by the men operating the longitudinal floats. Five men were used to handle the 2 floats, the hand belt and the edging. Two extra hand finishers were put on when the concrete was dry as when making a curve on a grade. The edger used by the finishers measured 10 x 12 inches which is rather larger than the usual edger used. This throws a bit more of a ridge of grout than was desirable so an ordinary whitewash brush about 8 inches wide was used by the finishers to brush over the ridge and smooth it out.

The longitudinal floating has been so well done on this job that the Superintendent boasted that he had paved  $7\frac{1}{2}$  miles and had the same two carborundum blocks he started with ready for use when required.

#### CARRYALL ON THE FINISHER

A 4-foot platform was built on the rear of the finisher to carry all kinds of things from center steel to a first aid kit. It was most handy to have a place at the center of the activity of the job where the tools and other things needed could always be found. The Superintendent intends to build a tool wagon for use next year with bins for the extra tools where they may be locked up at night and a small tool shop with heavy vices where quick repair work can be done on the job. The wagon would be kept about 100 feet ahead of the turntable.

A rolling bridge about 10 feet wide was carried on the forms behind the hand finishers with the burlap laid on it. The burlap was sewed up into 10 x 20-foot pieces and was spread on the concrete by the sprinkler man and those near by, such as the hand finishers. It took 4 men to handle the burlap but because of the size of the strips it went on very rapidly and on the whole considerable time was saved.

On the day following pouring the burlap was removed and the concrete covered with 2 inches of earth which was sprinkled for 10 days. This was stopped on July 16 and the earth cover omitted entirely. The burlap was left on the pavement for 72 hours and sprinkled and then removed and the pavement left untouched for the remainder of the curing period of 21 days.

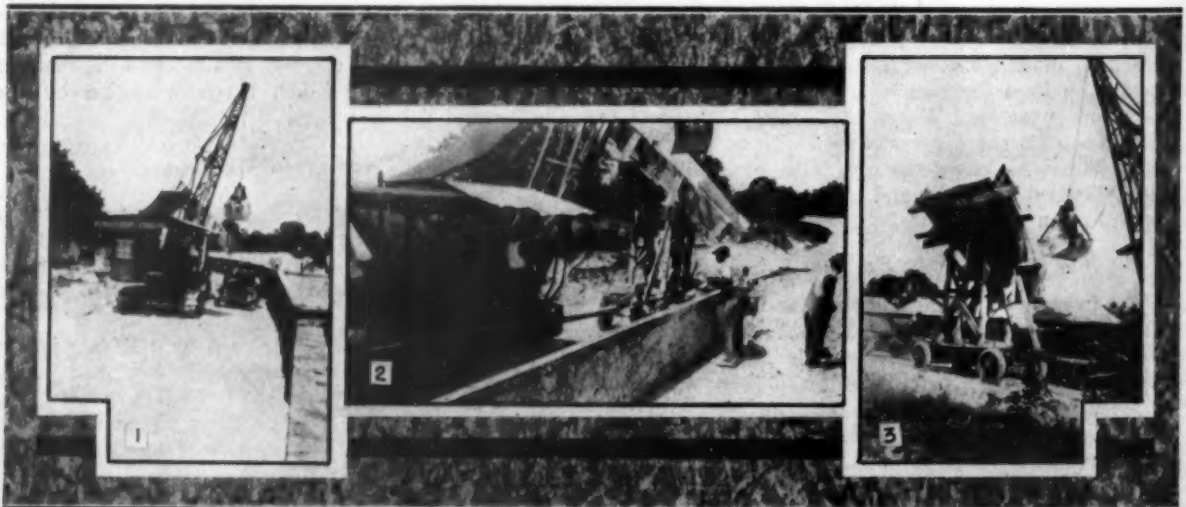
During the earth cover period one man was kept for each 1,000 feet behind the paver with 150 feet of hose sprinkling the concrete and cover.

#### EXPANSION JOINTS

Every 500 feet in the pavement the State specifications required an expansion joint. This was formed by two plates held 2 inches apart by a spacer board until the pavement had hardened. Then the spacer board was pulled out and the plates left until they were needed for the next joint. The plates were so inserted that the finishing machine could run over them without interfering with them. The joint was not poured by the contractor but remained open until the pavement was accepted by the State and then poured with hot asphalt by the state maintenance department.

#### PERSONNEL

W. R. Aldrich was Superintendent for W. R. Aldrich & Co., Dyersburg, Tenn. W. B. Haynes was Resident Engineer for the State Department of Highways and Public Works, with headquarters at Milan, Tenn.



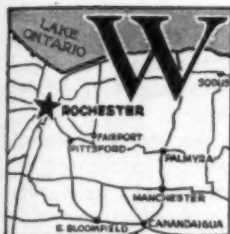
A NOVEL UNLOADING PLANT OF THE DUVAL ENGINEERING & CONTRACTING CO., OF JACKSONVILLE, FLORIDA

1. A P & H 206 crane with a Hayward 1-yard clamshell unloading lime rock from gondola cars direct to trucks by means of a galvanized iron chute mounted on a trailer and attached to the crane by a pole so that whenever the crane moved the chute moved also and was at a uniform distance from the crane at all times. 2. Close-up of the chute from the railroad side. 3. Back view of the unloading chute. This method permitted the crane operator to dump the bucket load quickly and without carefully spotting the bucket, thus speeding up the unloading process greatly.

# Motion Pictures Help Sell Products of New Ready-Mixed Concrete Plant

By Harold W. Butler

*Whitmore, Rauber & Vicinus, Rochester, N. Y.*



HITMORE, RAUBER & VICINUS, of Rochester, N. Y., are perhaps the oldest general contractors and building supply dealers in that city. Their policy has always been one of progress and in conformity with that policy and the demands of architects and engineers for better

concrete they decided that the best method of obtaining that product was by the erection of a modern ready-mixed concrete plant.

When the erection of a plant was decided on, members of the firm made inspections of plants and methods throughout the country and the best ideas of each of these various installations have been incorporated in the Rochester plant. One of the biggest questions to be decided was which type of plant to erect, that is, a central mixing plant where the concrete is thoroughly mixed and proportioned according to the latest methods and delivered in trucks ready for use or the second type where the aggregates and cement are mixed and placed in some type of a mixing trucks, the water being added and the mixing done when the truck arrives on the site of the work or shortly before arrival. After giving both methods serious consideration it was decided that the central mixing plant was the best method for the conditions to be encountered.

Inasmuch as this firm has been selling washed sand and gravel for some years and already had an aggregate plant to dry batch these materials, the aggregate situation was well taken care of before the ready-mixed plant was started. This aggregate plant is situated on a railroad siding and the materials are carried from the cars to the bins by means of belt conveyors. The bins are divided into 9 compartments for different sizes of aggregates with a total capacity of 1,250 tons. These bins have been connected with the central mixing plant bins by means of an overhead belt conveyor and the materials may be run direct from the cars to the storage bins over the mixer or taken from the aggregate bins to the bins at the mixing plant.

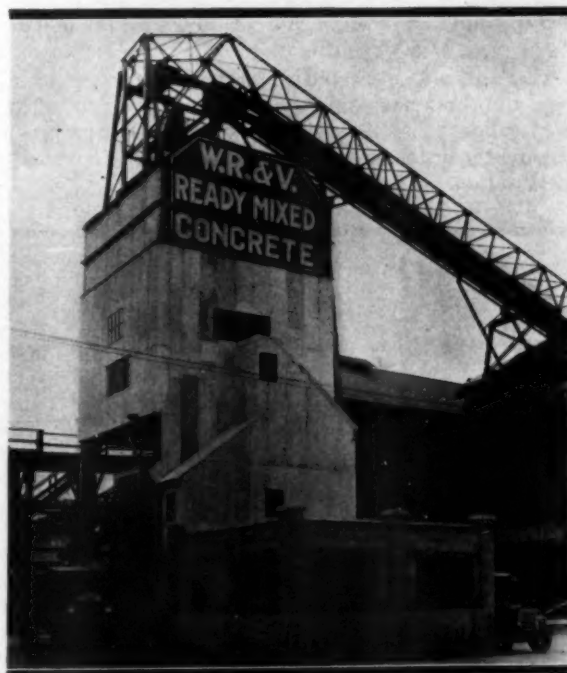
## COMPLETE WEIGHING BATCHING PLANT

The plant is erected on a concrete foundation and consists of a 215-cubic yard Butler bin, divided into six compartments, two for cement, one for sand, one for No. 3 gravel, one for No. 2 gravel, and one for No. 1 gravel. The discharge of each compartment is controlled by a gate. These gates dump directly into one large weighing hopper. The weighing hopper is divided into two compartments, one for cement and the second for aggregates. The reason for the division is that the cement has a tendency to stick to the sides of the hopper when dumped in with the damp aggregates.

All aggregates including cement are proportioned by weight which conforms with the best ideas of leading concrete designers. The weighing apparatus consists of a three-beam scale so that each aggregate may be weighed separately and also the various sizes of coarse aggregate may be proportioned to meet any designed mix calling for various percentages of different size gravel or stone. A tell-tale operates for whichever beam is being used so that the operator may tell to a pound when the correct amount of material has been admitted into the charging hopper.

## BULK CEMENT USED

It was decided to use bulk cement due to its lesser cost and also to the fact that it could be handled cheaper than the sacked product. The cement is received in box cars which are placed on a side track immediately adjacent to the plant. The cement is then shoveled by hand directly into a hopper which is connected with an enclosed bucket elevator which carried the material into two bins on top of the plant. A hood has been constructed which fits into the hopper and also around the car door which not only eliminates waste but prevents any dust from getting out of the car. The two cement bins hold about 250 barrels each, so that sufficient cement can always be kept on hand. Various methods of handling the cement were considered, but the method used has proved most satisfactory



*View of Ready-Mixed Plant Showing Truck Ready to Be Loaded*



*View of Storage Bins and Belt Conveyor*

and the unloading of this material is accomplished at a cost which is at least as low as any other in use at present with a very low initial outlay. Several  $\frac{1}{4}$ -inch openings have been provided in the sides of the cement bins, so that compressed air may be forced through and a steady flow of cement assured at all times. A small air compressor similar to those used by tire companies is sufficient for all needs.

#### THE MIXING PLANT

The mixer decided upon was a Lakewood, 56-cubic foot capacity and electrically operated. Immediately above the mixer is a charging hopper into which the batch is dumped from the weighing hopper. This arrangement makes it possible to have one batch in the mixer, one in the charging hopper and one in the weighing hopper so that no time is lost waiting for a batch to be weighed. The concrete footings upon which the mixer is placed have been so arranged that a second mixer may be placed alongside the present one if business warrants. A second mixer would double the output of the plant at a very little cost.

The water is measured accurately by means of a gage and the amount in each batch may be controlled to  $\frac{1}{4}$ -gallon. This is in accordance with the best practice and the water content can be controlled to meet any specification.



*View of Ready-Mixed Plant, Storage Bins and Conveyor to Carry Aggregates from Storage Bins on Ready-Mix Plant. Also Cement Warehouse*

#### CENTRALIZED OPERATION

The entire plant is so arranged that it is operated from a platform just above the mixer and one man can very easily take care of the entire operation from weighing the aggregate to dumping the concrete into the truck. A second man is usually kept busy doing odd jobs and assisting the truck drivers in washing down the truck bodies after each trip. A wash rack has been built alongside the loading platform so that the trucks may be thoroughly washed after each trip and the bodies well wet down before they are again loaded. This washing of the truck bodies is most important and great care should be taken to see that there is sufficient water available for this purpose.

Bath tub type bodies made by the Wood Hydraulic Hoist & Body Co., of Detroit have been purchased and mounted on truck chassis which are rented from various truck owners. These bodies have worked out very satisfactorily and no trouble due to segregation has been encountered.

All mixes used in the plant have been carefully designed according to the water-cement ratio and fineness modulus method for the particular aggregates which are used. Concrete meeting any strength requirement can be delivered and all tests have shown that compressive strengths obtained on concrete delivered have been considerably above those called for.

The plant is located on Mount Hope Avenue in practically the geographical center of the city and can deliver concrete to any part of the city within 25 minutes.

#### MOTION PICTURES USED IN DEVELOPMENT WORK

Whitmore, Rauber & Vicinus not only do general contracting, but also considerable sub-division development work. For this reason a large proportion of the concrete from this plant will be used on their own work. However, they are working on an educational campaign to prove to contractors, architects and engineers the value of ready-mixed concrete. They have made a small moving picture showing the plant in operation and the concrete being used on the job. It is their intention to exhibit this film before various clubs and societies and to give a short talk on the subject at the same time. Many contractors have already purchased ready-mixed concrete for both large and small jobs and those who have used it are more than pleased with the results obtained.

#### Grading the Charlotte, N. C., Airport

**T**HE Charlotte, N. C., airport is on a high slope and consists of about 200 acres. It is only about  $3\frac{1}{2}$  miles from the city to the airport.

As there were 112,000 cubic yards of excavation in the first contract alone, grading was one of the major items of construction cost. Nello L. Teer, Durham, N. C., was awarded the contract for draining. His outfit consisted of three Erie Gas-Air shovels and a fleet of crawler-tread Western dump wagons pulled by Caterpillar Sixty tractors. These wagons were of maximum size with extensions placed on their sides, enabling them to carry a real load when they made the trip from the shovel to the dump. Having several wagons the contractor placed them in trains. A tractor provided with a bulldozer attachment spread the material dumped in even layers, while a road machine was used for the finished leveling. The final operation was the dragging of an ordinary steel T rail over the runways for a smooth surface. L. J. Jordan, Charlotte, N. C., was engineer in charge of construction.



# A Road Salvage Job in Southern Michigan

*Old Macadam Used as Base, Widened With Concrete Strips for Asphaltic Concrete Binder Course and Sheet Asphalt Top*



N U. S. Route 12 from St. Joseph south, the W. J. Lang Construction Co., of Benton Harbor, Mich., handled a widening project in an interesting manner last summer. The work called for grading the existing shoulders and laying 9 to 11-foot strips of 8-inch concrete alongside an old macadam base. The whole 36-foot width was then brought to an even grade with from a 1½ to 8-inch binder course with a 1½-inch sheet asphalt top. The project was 3.682 miles long and included several super-elevated curves which were widened in accordance with Michigan specifications.

## EXCAVATION AND GRADING

The grading was not of sufficient quantity nor depth to call for the use of a power shovel so it was handled expeditiously with Baker-Maney wheeled scrapers, a Haiss excavator and a power grader. The Haiss excavator was found to be particularly useful in this work as it cut the edges of the old macadam where they were too thin to use to advantage and loaded all the material direct to the trucks to be hauled away from that point to fill elsewhere. Later the excavator was taken to the borrow pit where material was loaded from the face of the pit for the shoulder fill on the north end of the job and superelevated and widened curves. The maximum fill came on the outside curve in the curve sections where superelevation and widening were required.

Drainage was provided along sections where the land was wet by digging a drainage ditch to a maximum depth of 5½ feet with a Buckeye wheel-type trencher and laying 8-inch vitrified tile and covering the joints with burlap. The trench was backfilled carefully by hand taking pains not to displace the tile and the top section of the trench was tamped to insure against sinking and settling after completion.

The strips which were paved with concrete were prepared by the grader for the final grade and varied from 9 to 12 feet in width. This was due to the varying centerline of the old macadam and the new line and because the old pavement was broken at some points making it useless for a base for the new top. Steel forms were set to line and grade at the outer and inner edge of the new concrete strips giving an 8-inch depth.

## UNLOADING AND HAULING AGGREGATES

Sand and gravel were received by rail at a siding

about ¼ mile from the project and off-set at about the middle of the job. Both aggregates were unloaded by a Lorain-60 crane with a Williams 1-yard bucket direct to the Butler bins and batchers or to stockpile. Cement was received from the State cement plant which is operated by skilled men at Chelsea, Mich., and spotted about 300 feet from the batchers where it was loaded onto the trucks 5 bags at a time direct from the cars. The batches were hauled from the batchers to the MultiFoote 27-E paver on the road by a fleet of 10 International trucks carrying two batches at a time. The Grade A batch was made up of 2,055 pounds of stone and 1,215 pounds of sand but varied from day to day according to the moisture content of the aggregates. The water-cement ratio was used throughout to control the amount of water used at the mixer. A chart for proportioning concrete material made up from materials actually used on this project was furnished to the inspector at the proportioning plant and gave very satisfactory results.

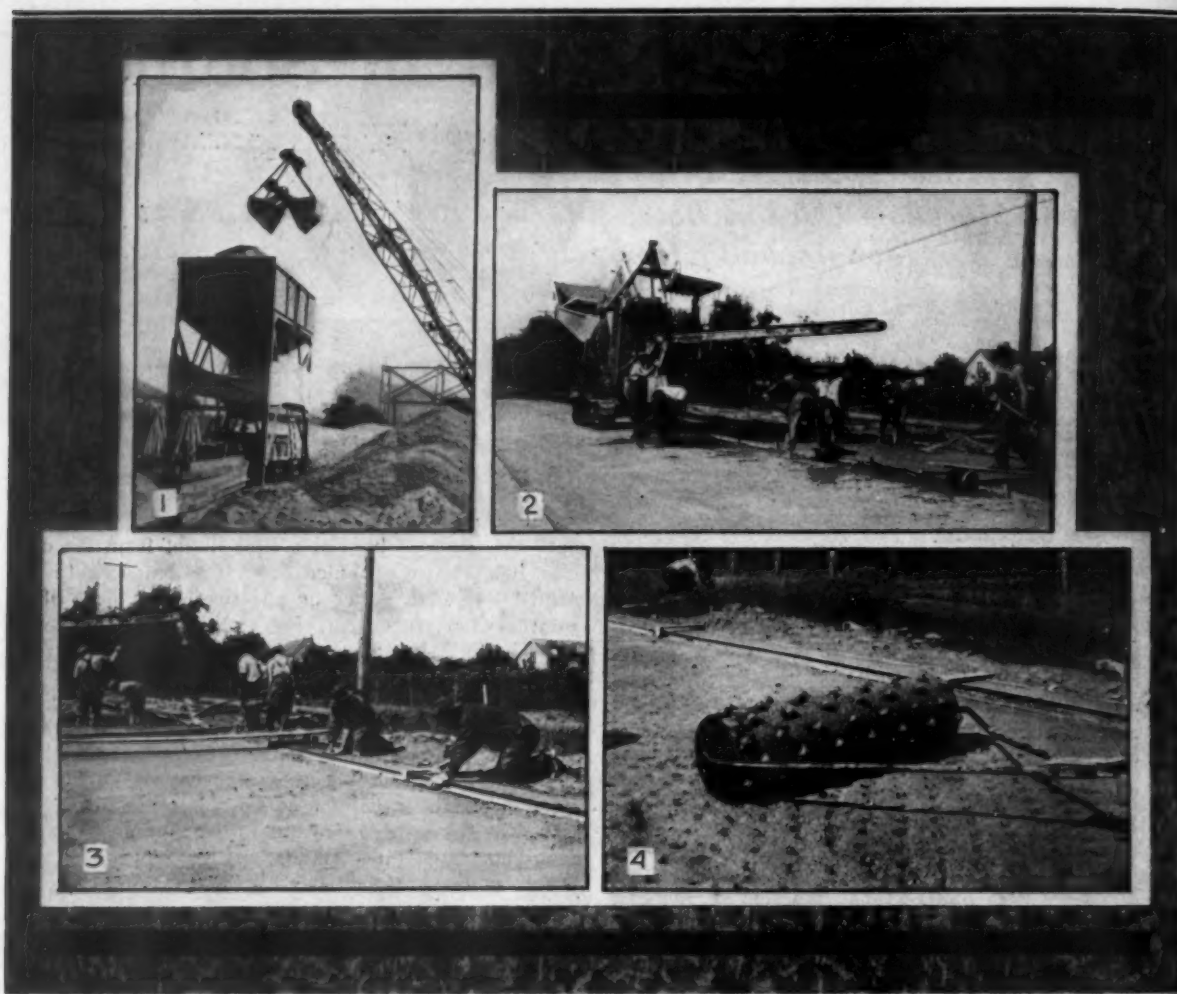
## PAVING CREW

The widening strip on either side of the road was surmounted with a curb 1 foot wide and 2¾ inches high formed immediately after the concrete was poured for the slab by setting curb forms and hand finishing. An average of about 1,000 feet of the slab of varying widths, but averaging 10 feet, was poured per day. The final slab was 8 inches thick and was not reinforced at any point. To roughen the slab to hold the binder course better, it was rolled with a home-made roller made of a log about 5 feet long and 12 inches in diameter which was set with studs of bolts and washers about 1½ inches in diameter and projecting about the same amount.

The crew for this work consisted of: 1 man dumping the trucks; 1 operator for the MultiFoote paver; 6 men shoveling concrete; 2 men hand floating the surface; and using the template to give it the proper contour; 2 men shoveling to the curb forms and 3 men hand finishing the curbs. A crew of 10 men with shovels were used on the final grade ahead of the paver. There were 6 form setters.

## SUPERELEVATION OF CURVES

There were several long curves on this job which were superelevated according to Michigan practice. One of these was a curve of a radius of 1,011.51 feet, 5 degrees, 40 minutes, superelevated 0.06 foot per foot of width and with a maximum widening on the inside of the curve of 2.8 feet and with 0.8 foot taken off at the outside of the curve.



OPERATIONS AND EQUIPMENT OF THE W. J. LANG CONSTRUCTION CO. ON ITS SALVAGE JOB NEAR BENTON HARBOR, MICH.

1. One of the fleet of International trucks receiving its batch at the Butler bin and batcher. Boom of Koehring crane at the right with clamshell ready for the return trip for another load. 2. The MultiFoote 21-E paver running on the old macadam pavement and pouring one of the widening strips. 3. Hand finishing the curb immediately behind the paver. 4. Roller developed by the contractor for roughening the surface of the concrete slab after floating, to insure sufficient bond between the binder course and base.

#### BINDER AND SURFACE COURSES

Both binder and surface courses were mixed in a railroad-type Iroquois plant located at Benton Harbor on the B & O R. R. about 8 miles from the center point of the job. The sand and stone for the binder course were dried and heated to between 300 and 400 degrees Fahrenheit in the plant drier and then screened and stored in the proper hot bins. The bituminous material was heated in the adjacent kettle to a temperature ranging from 290 to 335 degrees.

The binder course materials, sand and gravel, were weighed separately, 65 to 85 per cent of stone and 15 to 35 per cent of sand, mixed and then impregnated with 4 to 6 per cent of asphalt and mixed for at least 45 seconds or until the mass was homogeneous. The batch was then dumped into the asbestos lined trucks and hauled to the job covered with tarpaulin. The materials for the binder course were properly graded in accordance with Michigan specifications. Asphalt cement furnished by the Standard Oil Co. of New Jersey was used.

The sheet asphalt mixture was made in the same manner except that after the sand and filler had been thoroughly mixed following weighing, the asphalt material was added and mixed not less than 1 minute. The materials in the sheet top mixture were proportioned as follows: sand, mineral filler and asphalt cement containing from 10 to 20 per cent mineral filler and 9 to 11 per cent bitumen. Limestone dust was used as a filler.

The binder course was laid to a depth of  $1\frac{1}{2}$  inches but there were wide variations from this because of the rough contour of the old macadam base which in some places was below and in others above the concrete widening strips which were poured to a grade which would give uniform binder and sheet top courses  $1\frac{1}{2}$  inches thick. All low spots in the old base were brought to grade with the binder course to give a uniform sheet asphalt surface course.

#### PERSONNEL

Charles Gribble was Superintendent for W. J. Lang

Construction Co., Benton Harbor, contractors on this project. The work was under the supervision of R. A. Beers, Resident Construction Engineer for the State, and in charge of Theodore Timchac, Project Engineer. R. D. McLean, Vice-President of the company, and his son, Donald, laid the asphalt. W. R. Kenoyer was Instrument man; Earl Graft, Street Inspector; Robert Dukeshire, Concrete Plant Inspector and Roy Anthony, Plant Inspector.

### Concreting Plant for New Iowa Athletic Stadium

**W**HEN the contract for the new athletic stadium at Iowa City for the University of Iowa was let to the Tapager Construction Co., Albert Lea, Minn., it was with the understanding that the project would be complete by September 27, 1929. The stadium consists of two concrete stands at opposite sides of the playing field. Each stand is 430 feet long and about 80 tiers deep. Over 8,000 yards of concrete had to be placed and 100,000 yards of earth had to be moved.

For the purpose of placing concrete, each stand was blocked off in three sections. On the outside of the western stand, and midway between the ends, the concrete plant was located. This consisted of a  $\frac{1}{2}$ -yard Koehring mixer, an overhead aggregate bin, an Insley tower and chute. Materials were trucked three blocks from the railroad, and the sand and gravel dumped on the ground at either end of the mixer, while the cement was stored in a shed a few feet from the mixer and connected with it by a runway. Sand and gravel were fed into the overhead hopper by a steam shovel.

At first the same size crews of carpenters and concrete workers were worked through the 24 hours. It was soon discovered that the efficiency of the carpenters was so low at night, as to warrant dispensing with them after dark.

An interesting feature of the job, which is reported in *The American Contractor*, is the presence of two cooperating superintendents, Clarence Foley and Vigo Jensen, neither of whom had charge of any specific part of the job. They were held jointly responsible for the successful completion of the job on time.

### Demolishing a Steel Stack by Oxyacetylene Cutting

**M**ANY have been the stories of the methods used in demolishing brick chimneys, but recently a firm of engineering contractors was faced with the problem of demolishing a steel stack at a furnace plant. The stack was 200 feet high, 13 feet diameter at the base, 8 feet in diameter at the top and of heavy steel plate with brick lining throughout. On account of adjacent structures, it was necessary for the stack to fall as planned within a very restricted area.

In order to have the stack drop in the required space and to steady the stack during the cutting of the steel plate with oxyacetylene torches, two guy cables were attached at right angles to the line of fall and secured to dead men through hemp rope lines. A heavy pulling cable was attached near the top of the stack and run out 500 feet in the direction of the line of fall and fastened to a locomotive.

The sections to be cut just above the base of the steel shell were marked in chalk, so that the cutter simply followed the line which had been laid out in duplicate on two sides of the stack. Two cutters worked away from each other at the same speed and the inside masonry was removed as they went along. When the steel had been cut around nearly half of the circumference of the stack and the brick inside removed, leaving a wedge-shaped opening, the stack listed in the direction of the locomotive and was quickly pulled over. The lines of the guy cables were cut with an axe as the stack started to fall.

## Excavation in Connection With Large New Power Plant

**T**HE new \$10,000,000 power plant of the American Enka Corp., located on a 2,000-acre tract on Hominy Creek within 4 miles of the downtown section of Asheville, N. C., was completed early in June, 1929, having been started in December, 1928. Preparation of the ground for construction required the excavation of 500,000 cubic yards of earth



*A Thew-Lorain 75 Handling Grading Excavation to Western 6-Yard Dump Cars*

which was let to the Nichols Contracting Co., Atlanta, Ga. Seven power excavators were used, including two Thew steam shovels, an Osgood steam shovel, a Lorain-75 dragline, and two Thew-Lorain gasoline shovels. The Lorain-75 was used to move the bed of the stream nearly one mile of its length. The  $1\frac{1}{4}$ -yard Lorain shovel was used to load the excavated material into trains of 6-yard Western standard-gage dump cars.

All of the sewer excavation was handled by the  $\frac{1}{2}$ -yard Universal-35 equipped with a  $\frac{1}{2}$ -yard Owen bucket. Quick-sand was struck necessitating laying at least 25 per cent of the terra cotta pipe on concrete mats. In all, about 15 miles of sewer and water lines were laid. The terra cotta sewer pipe from 6 to 42 inches in diameter, was made by the Cannelton Sewer Pipe Co., Cannelton, Ind.



*A Universal 35 with  $\frac{1}{2}$ -Yard Owen Clamshell Working on Sewer Excavation*

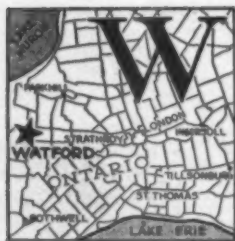
The sewer backfilling was handled by the Universal-35 and a Universal truck crane equipped with a  $\frac{1}{2}$ -yard Owen clamshell bucket.

The water line was composed of redwood pipe shipped from California. The wood was shipped with tongue and groove cut and was laid and bound in the trench. The wood pipe lines were all 24-inch diameter.



# Industrial Railway on 8-Mile Ontario Paving Project

*Ryan Construction Co., Averaged 1,200 Feet of Concrete Daily  
Using Complete Grading and Paving Equipment  
and Minimum of Hand Labor*



ways during the 1929 season and then moved the entire industrial paving outfit and camp over 100 miles to complete another project before the early winter shut down on operations. The job to be described was located about 30 miles west of London, Ont., and 8 miles west of Strathroy, Ont. The highway formed an L with Watford at the angle and  $4\frac{1}{4}$  miles of road extending toward Strathroy and  $3\frac{3}{4}$  miles extending toward Provincial Highway No. 7. Work was first started from Highway No. 7 and worked toward Watford where the batching plant was located and then from the Strathroy end to Watford, the job being started on June 5, and completed on July 26.

## ROUGH GRADING

For the rough grading which consisted mostly of a long fill embankment on a curve near the Highway No. 7 end of the work a Koehring shovel was used with a Mack, a White and a Federal truck handling the earth to fill.

## FINE GRADING

On the fine grade a Caterpillar Thirty tractor with an Adams grader did most of the work with a Lakewood subgrader being pulled along on the forms by the Huber 10-ton roller to give the proper cross section to the subgrade. The section measured 10 inches at the forms and 7 inches at the center of the 20-foot slab, the diminution from 10 to 7 inches taking place at the rate of 1 inch per foot of width, for the 3 outside feet.

## FORM SETTING

The Lakewood 10-inch forms were set 1,000 feet ahead of the paver to make it possible to get the maximum benefit from the subgrader. When setting the forms a Carr formgrader was used to give the exact line and to furnish a firm foundation for the forms. A total of 4,200 feet of forms was kept on the job throughout the work. A crew of 4 men was used to set the forms and 1 man to oil them ahead of paving and after the subgrader had completed shaping the grade and the crew of 5 men on fine grade had thrown all the loose earth picked up by the subgrader out over the forms onto the shoulder.

ITH mechanical equipment used throughout the work and a very apparent endeavor to handle the work better than required by the specifications, the Ryan Construction Co., Walkerville, Ont., built 8 miles of 20-foot concrete pavement for the Ontario Department of Public High-

## CARRYALL A GREAT HELP

Ahead of the paver a platform mounted on 8 wheels was maintained to take care of several drums of gasoline, oil, a pile of center strip and pins for setting it, extra rubber boots, an extra subgrade template, sledges and miscellaneous tools. The platform was 20 feet across, as it rode the forms on grooved wheels, and about 6 feet wide. It was kept about 120 feet ahead of the paver and moved by several men as the paver approached it. Every night any loose tools found on the subgrade or on the shoulder behind the paver were thrown onto the carryall by the watchman and thus were ready for use in the morning instead of being lost as so many tools are on rapid paving work. Such a device would not be of any value on a job where truck haulage was used as it would interfere with the trucks reaching the paver.

## BATCHING PLANT

Sand and gravel were received at the batching plant siding by rail from Paris and Sarnia and cement from Port Colborne. In spite of the fact that there was no cement storage shed provided at the batching plant there was no demurrage paid by the contractor on cement during this contract. Deliveries were so well gaged that there was a minimum of cement left each night at the platform and this was covered with heavy tarpaulins.

One spur track of the Canadian National Railways was used for the sand and gravel cars which were dumped into two wood lined pits. In the batching plant a winch was used to spot railway cars instead of hand work with car movers. When gondola instead of hopper-bottom cars were received the Koehring crane with a  $\frac{3}{4}$ -yard Owen bucket worked direct from the cars instead of from the pit. One man worked in the cars cleaning up or, when the pit was used, cleaned up any material spilled outside the pit. Alongside this full-gage track was the industrial railway track on the far side from the crane. The crane picked up material from the stockpiles and delivered it to the bins built with four Johnson batchers. One man operated the four batchers. The 24-inch industrial track ran under the batchers and a train of one Plymouth gasoline locomotive with five cars forward and five behind ran through and received the batches.

The trainload of aggregates was then run out to a switch about one train length from the batchers and run back on the cement track. The cement shed was built between the second full-gage track and the narrow gage track. Six men on the cement platform quickly emptied the  $9\frac{1}{2}$  bags of cement into the cement compartment in the Lakewood batch boxes, mounted two

to a car, and the train pulled out on its haul which varied from  $5\frac{1}{2}$  miles maximum to about  $1\frac{1}{4}$  mile minimum. A government inspector checked all cement as received at the cement platform as the cement was furnished by the Department. The inspector reported all torn bags which ran as high as 200 to a car. This was a help to the contractor as well as to the department as the contractor is required to pay for all bags returned to the cement plant in a damaged condition. The inspector's report made at no expense to the contractor saved him considerable money as it must be accepted as authoritative by the cement company. One man was used all the time at the cement platform baling the empties.

Six Plymouth locomotives and 70 Lakewood cars with 140 batch boxes were used on this job. Each train of ten cars had an engineer and a "trip rider" or trainman. It was the unchangeable rule throughout the work that no individuals other than the two men making up the train crew were to ride on the trains whether running full or empty.

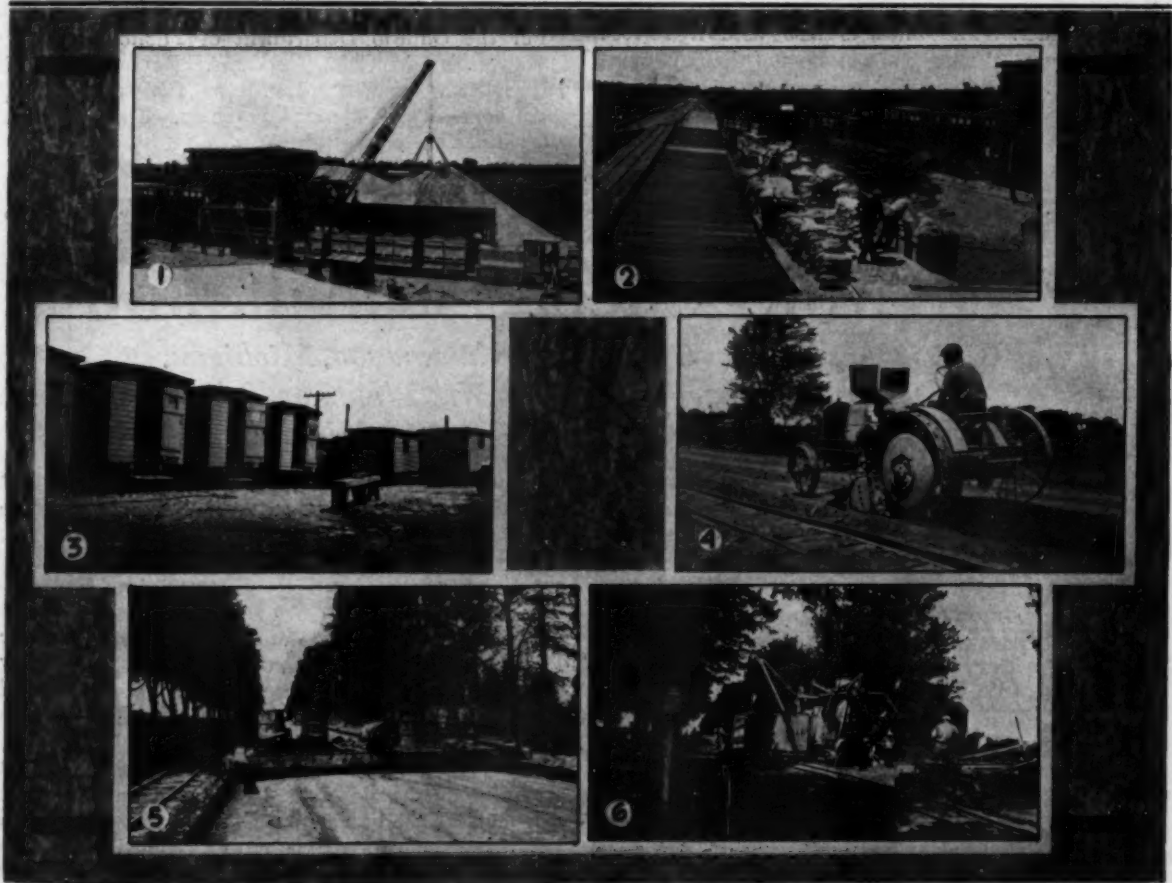
#### SWITCHING SCHEME FOR TRAINS

On the  $5\frac{1}{2}$ -mile leg of the job five switches were

maintained for trains to pass. At the paver a scheme for saving time while the trains were switching and thus preventing any loss of time at the paver was used. When a train arrived at the paver it moved along until the last two or three cars were reached. These were then cut off and the train run down past the next switch behind the paver. The train then waiting on the switch ran up and by that time the two or three cars had been moved along by hand and the batches emptied into the paver. This train then picked up the cars with the empty boxes and started back to the batching plant while the train which had dropped the cars moved into the switch to be ready to pick up the cars dropped by the next train. In this way and by varying the number of cars dropped to suit the distance the trains had to move to the switch behind the paver, considerable time was saved.

#### PAVER KEPT BUSY

Everything was set to keep the paver busy. First, a double water connection was installed on the paver so that at no time was the paver without a water connection. Two hoses were kept handy and as soon as the paver was near the limit of the first hose the



#### WELL-BALANCED PLANT MADE RAPID WORK POSSIBLE

1. The batching plant, showing the Koehring crane unloading the gondola cars to the Johnson bins with four batchers, the industrial railway train and Plymouth locomotive in the foreground. 2. Loading cement into the cars from the cement platform. Photograph taken from the top of the next cement car to be opened. 3. A part of the well-kept wagon camp. 4. The Carr form grader making the trench for the Lakewood forms. 5. The Carryall, the "most useful piece of equipment on the job" according to the Superintendent. It carried everything from the gas and oil for the paver to rubber boots for the men. 6. The start of the pavement working toward Watford from the Strathroy end, showing the Koehring 27-E paver, and the Lakewood finisher with the train of 10 cars, 5 ahead and 5 behind the locomotive, at the paver.

second, which had already been attached to the next gate on the water line, was attached to the second connection on the paver, the stop cock momentarily shut off, the first hose taken off and the cock turned to open the supply from the second hose.

The paving crew consisted of 14 men, each of whom was on his toes to keep up the fine paving record maintained by this organization. Last fall a run of 2,036 feet of 20-foot slab was laid and this season the crew poured 110 feet an hour for 100 hours through successive days. The paving crew averaged 1,200 feet per working day on this job with no work other than the necessary spreading of calcium chloride and repairs to equipment on Sundays. The duties of the men making up the paving crew were: 1 man oiling forms, 2 men dumping batch boxes, 1 man on the water hose, 2 men on setting center steel and sprinkling the sub-grade, 1 paver operator, 2 men spreading concrete, 2 men shoveling to the finisher strike-off, 1 operator on the Lakewood finisher which screeded, tamped and belted the concrete, 1 hand finisher and 1 helper who hand floated the concrete after the finishing machine had made two passes over the section, and one man spreading Solvay calcium chloride by use of a 2-wheel hand spreader. The finishers also used a 10-foot straight-edge to check the smoothness of the pavement. This is not required by the Ontario specifications but was done by the contractor to insure as good a job as possible. As a protection to the belt on the finishing

machine it was oiled at the end of the day to prevent concrete sticking to the belt.

#### CONSTRUCTION CAMP

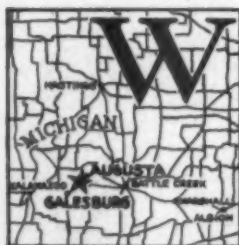
A complete construction camp for 65 men was maintained at the batcher plant at Watford. The bunk wagons, for all the camp was on wheels, had accommodations for 10 men in each wagon. In addition there was a complete kitchen in one wagon, a pantry or storage wagon with large box in one end capable of holding several whole beefs, and an office with four bunks for the use of the principals of the company at any time they might need them when no hotel was available. The kitchen wagon had an alcove which was used by the cook as his bed-room. Everything about the camp was as clean and neat as could be expected under the conditions of construction. Water was supplied to the camp from the local supply. Light for all the wagons was supplied by a Delco outfit in one of the material supply wagons. Substantial wood stairways led from each wagon to the ground and the kitchen, two mess wagons and the pantry wagon were connected with a platform to make the group easily accessible.

#### PERSONNEL

For the Ontario Department of Public Highways, L. L. Jarvis was Chief Inspector. Raymond Arnold was Superintendent for the Ryan Construction Co., and Charles Tuley, General Foreman. There were no other foremen on the project.

## Complete Railroad Mixing Plant for 7.498-Mile Sheet Asphalt Job

*Globe Construction Company of Kalamazoo, Michigan,  
Uses One of Three Large Hot Mix Plants on Job  
Between Galesburg and Augusta, Mich.*



WHEN the Globe Construction Co., received the award for the construction of the 7.498-mile sheet asphalt pavement between Galesburg and Augusta, Mich., it was planned to use the local traction company tracks for the delivery of aggregates. Through some difficulties the traction com-

pany withdrew from the field as far as its rail facilities were concerned and left the contractor with a haulage problem on his hands.

Stone was coming in from the France Stone Co., from its Montoe, Mich., plant and sand from the American Aggregate Co., Kalamazoo, by rail to the delivery point about  $\frac{3}{4}$ -mile from the mixing plant. If the traction company had continued operations it would have been possible to haul direct to the mixing plant, but with this facility eliminated it was necessary to unload into trucks and haul to the plant, dump into pits and reload with the Erie crane to feed the F. D. Cummer 1,800-yard railroad plant which is one of three owned by this com-

pany for its extensive operations in the sheet asphalt field. Fourteen men were employed at the plant located at Gull Lake Junction about 4 miles from the Augusta end of the job.

#### PREPARATIONS FOR PAVING

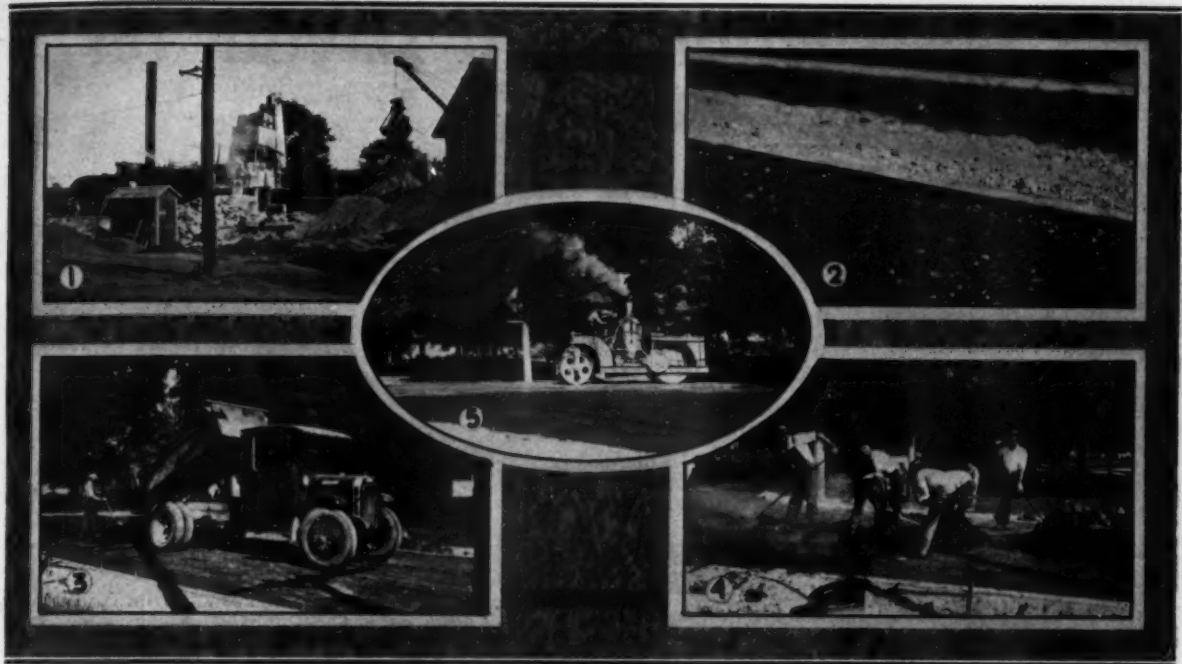
Before laying of the  $1\frac{1}{2}$ -inch binder course and the  $1\frac{1}{2}$ -inch sheet asphalt top could start it was necessary to place about 40,000 square yards of gravel base and 3,000 cubic yards of resurfacing to prepare the old 6-inch treated gravel base for the new pavement.

The old base was shaped where necessary with a grader along the old grade. This work was done with light cuts of the grader and checked with a template. Following the cuts the base was cleaned by brooming to remove all loose material prior to the laying of the binder. The material swept from the surface was used later to bank up the shoulders.

#### THE BINDER COURSE

The contractor was paid \$6.25 per ton for the binder which was used to make a layer over the uniform surface of the old base and to fill up any inequalities in the





#### MIXING PLANT AND COMPLETING THE SHEET TOP AT AUGUSTA, MICH.

1. The Cummer 1,800-yard railroad hot mix plant set up and producing base course and sheet top for the 7.5-mile job between Galesburg and Augusta, Mich. 2. The base course completed, showing the forms reset for the sheet asphalt top. 3. Federal truck with Wood hoist dumping a load of top mix. 4. The rakers and shovelmen spreading the top for the roller. 5. The Buffalo-Springfield tandem steam roller compacting the top course.

base. The base was cleaned and before the application of the binder the surface was treated with a cold bituminous material,  $1/4$  to  $1/3$ -gallon per square yard, to increase adhesion of the binder course. The binder material made up of 33  $1/3$  per cent of  $1/4$  to  $1/2$ -inch stone mixed with 66  $2/3$  per cent of gravel of the same sizes was mixed in the Cummer plant in the 1,200-pound batches which included approximately  $4 1/2$  per cent of Texaco 40-50 penetration asphalt and 20 per cent sand.

A fleet of 7 hired trucks was used for the hauling of the binder course from the plant to the job, payment being made by the hour. The 3 to  $3 1/2$ -ton trucks hauled 8,400-pound loads throughout the work. During most of the work the truck bodies were covered with tarpaulin to retain the heat in the batch which was about 275 degrees for the binder course material and 325 for the top course. The truck bodies were oiled before each load was dumped using old motor oil. The nominal width of the road was 18 feet but the binder course was laid 19 feet wide and without forms. This gave a good foundation for the forms which were laid 18 feet apart for the top course and also protected the road from fraying under traffic which might ride at the edges. An average of 700 tons of binder per 6-day week was produced at the plant and laid on the road and about 13,000 square yards of sheet asphalt top laid to a thickness of  $1 1/2$ -inches.

#### LAYING THE TOP COURSE

A fleet of about 5 trucks was used for hauling the top course material which was delivered at the job at a temperature ranging from 225 degrees to 325 degrees. The specifications for the top course called for the following composition: a mixture of sand, mineral filler

and asphalt cement containing 10 to 20 per cent mineral filler and 10 to 13 per cent bitumen. The materials were mixed for a period of at least one minute with bituminous material after being thoroughly mixed dry.

Forms of  $1 3/8$  x 6-inch planks with holes for the steel pins bored at the ends and center were laid from 200 to 800 feet ahead of the paving operations by 2 men and backfilled with earth from the shoulder. The sheet asphalt mixture was dumped on the binder course sufficiently ahead of the work so that the entire load had to be forked or shoveled to its final place on the road with hot forks, rakes and shovels. Two 8-ton tandem steam rollers, one an Iroquois and the other a Buffalo-Springfield were used to roll the material to final compaction.

The paving crew for this work consisted of 2 form men, 2 men to operate the rollers, 2 men to fill any low spots in the finished surface after it was checked by a man with a 10-foot straight-edge, and the man operating the straight edge broomed cement over the rolled surface after it has been completed.

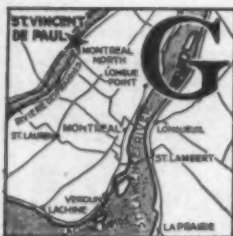
#### SPECIAL WORK ON THIS PROJECT

The Michigan State Highway Department maintained a complete field laboratory on this job at the mixer plant. In addition there was considerable experimental work with cores taken from the finished top by the use of a jack mounted beneath one of the rollers and cutting a core  $1 1/2$  inch in diameter and of the same depth. These cores were sent to the Department laboratory at University of Michigan at Ann Arbor and tested for stability and composition.

(Continued on page 73)

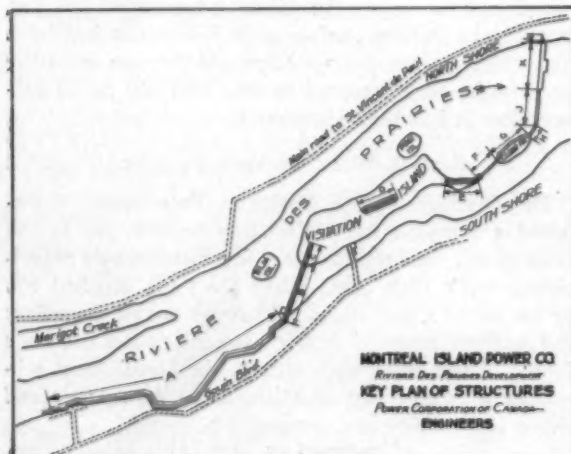
# Construction Plant Layout on Montreal Power Project

*90,000 Horsepower Development Just Outside the City of Montreal Has Effective Plant for Material Handling to Speed Work for Fall Opening*



GRAVITY handling of concrete from bins at elevation 170 to the bottom forms in the wheel pits at elevation -3, a transfer car running on a 35 per cent incline from elevation 140 to the generator floor at elevation 54 and capable of handling full loaded freight cars of steel and electrical equipment, an incline for handling rock spoil from the tailrace and a cableway for handling all materials until the transfer incline was built and, since the completion of the larger unit, used for handling miscellaneous equipment and supplies speedily, make up the features of the plant used by P. Lyall & Sons Construction Co., Ltd., on its contract for the construction of a 90,000 horsepower hydro-electric plant on Riviere des Prairies or Back River between the island of Montreal and Ile Jesus. The ultimate installation is 90,000 horsepower (10 units) of which 6 are being installed. This will give an output of 65,000 horsepower which has been sold for 30 years to the Montreal Light, Heat & Power Co. Two wheels will be ready for delivering power November, 1929.

The entire contract includes: 3,500 feet of retaining wall, known as Structure A; a 1,450-foot concrete spillway, Structure B; a concrete retaining wall, Structure C; an earth fill at a low point on Visitation Island, Structure D; a concrete retaining wall, Structure E; a concrete spillway, Structure F; a concrete retaining wall, Structure G; a concrete spillway, Structure H and Sluiceways, J; and the power house proper, Structure K, as shown on the key-plan. Structures A, B, C, D and E were sublet to Gorman & Peckham, Montreal,



Que. The Dominion Bridge Co., Montreal, are sub-contractors for the steel erection on the power house section.

## CABLEWAY

The first piece of material handling equipment to be erected was a 500-foot cableway just west of the center-line of the power house. This was used to handle the initial deliveries of construction equipment, materials and supplies to the site of the work below. As soon as the transfer car was ready for service this cableway became secondary as its capacity is limited. It did prove of great value both before and after the completion of the transfer car as first it was the only means of ready transportation and afterwards it was the speediest means of removing small equipment such as pumps, compressors, drills, etc., that needed repair.

## ROCK SPOIL INCLINE

To more readily handle rock excavated from the tailrace and to get it up out of the way so that it would not interfere with the operation of the plant when completed, a 35 per cent incline was built in connection with the narrow gage railroad which ran on top of the cribbing. Thus when cars were filled with rock they could be hauled to the incline by the Vulcan steam locomotive and then up the incline by the Flory-Mussens hoist. The cars were dumped along the incline as desired or into the crusher. Much of the rock from the area below the power house which was excavated about 20 feet in rock was used for filling the outer cribs as construction continued.

## TRANSFER CAR

A spur track  $1\frac{1}{2}$  miles long of the Canadian Pacific Railway delivered materials to the job and single cars were spotted on the transfer car at the top of the incline. The structural steel transfer car was lowered by an 8-part steel  $\frac{7}{8}$ -inch cable using two independent brakes on the Flory-Mussens hoist. The motor was air cooled to prevent over-heating on the pull upgrade. The car made the trip down or up in 12 minutes. The electric hoist was installed in a concrete-lined pit at the top of the slope and the transfer car at the bottom of the incline entered a concrete-lined pit. The maximum capacity of the transfer car was 76 tons live load.

## CONCRETE PLANT

Rock for the concrete was secured from the excavation of the powerhouse and tailrace. It was loaded into narrow gage dump cars by 3 Bucyrus-Erie shovels and hauled to the incline by Vulcan locomotives. It was then snaked up the incline by the steam hoist and dumped into the hopper over the jaw crusher. From



#### MATERIAL HANDLING ON THE BACK RIVER PROJECT AT MONTREAL

1. View from the downstream cribbing showing the rock incline, the concrete mixing plant and the incline for the transfer of loaded freight cars. 2. Loading concrete into industrial railway train for hauling to power house. 3. Pouring the draft tubes by dumping from the industrial railway cars into a wedge-shaped hopper and thence through metal chutes to the forms. 4. The freight car transfer incline. 5. Upstream side of the power house, showing the upstream cribbing.

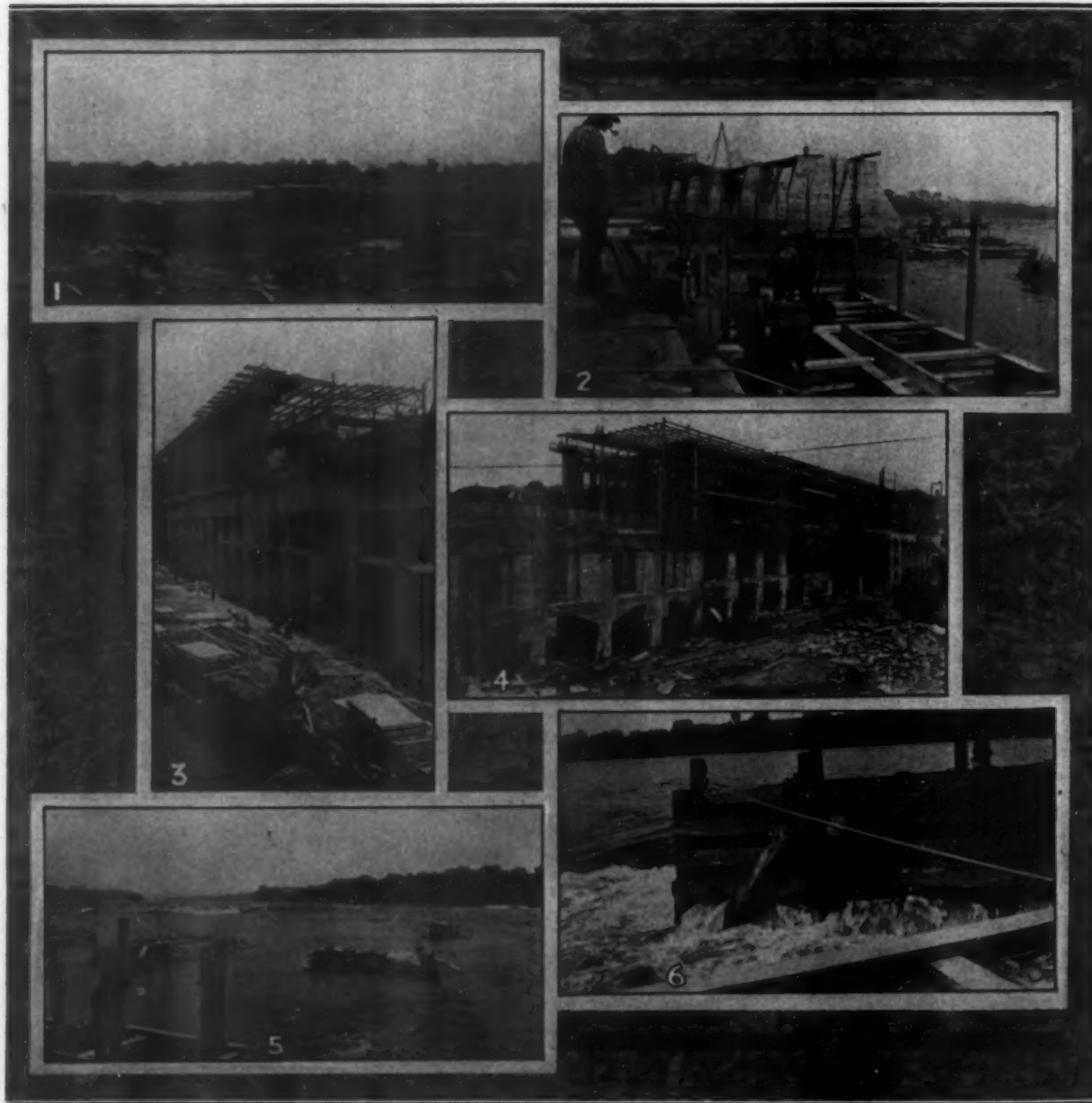


this primary crusher it went to two secondary gyratory crushers and then to the screens. A belt conveyor carried the stone to a pit from which a bucket conveyor lifted it to the main rock storage bin above the concrete mixer. When this was full stone was transferred by another belt conveyor to the secondary storage bin about 75 feet north. When this was full the hopper gates could be opened and the stone loaded into industrial cars and hauled to storage in an open field about  $\frac{1}{4}$ -mile distant.

Sand for the work was delivered generally by hopper-bottom railroad cars from Joliette, Que., and dumped directly into the sand bins alongside the stone bins.

Canada cement was delivered in bulk and dumped into a bin back of the sand and stone bins. A large horizontal boiler was used during cold weather to heat the aggregates.

Both sand and stone were weighed by Erie steel batchers and the cement measured carefully by weight for each batch and conveyed from scales to hopper. Water was measured to the pint in accordance with the requirements of the mix which averaged 1:2:4 and 1:2½:5, the specifications calling for 3,000 and 2,200-pound concrete. One 2-yard and one 1-yard Smith mixers were used, the smaller unit being held in reserve in case of a breakdown. The mixers discharged



#### PROGRESS OF CONSTRUCTION ON THE BACK RIVER PROJECT

1. Downstream cribbing, showing the pumps for keeping it unwatered. 2. The outer section of the sluice gate cribbing. 3. Upstream side of the power house, showing gate openings and log chute. 4. Downstream view of the power house, showing the draft tube openings. 5. Extreme outer portion of the work on June 6, looking downstream where the speed of the current may be noted from the size of the waves. In the center are seen the remains of the piers which were washed out in the January flood. 6. The fender crib used to protect the cribbing as it is being placed.

the concrete into a chute which delivered it to a hopper holding about two batches. The flow from the hopper to the Western steel side-dump industrial railway cars was controlled by a gate operated by a hand wheel and a chute which prevented undue splashing of the mix. The concrete trains, of which there were two, were composed of four cars and a Vulcan gasoline locomotive. The two trains ran very rapidly to the spot where the load was to be dumped and passed on a siding about half way out the power house.

In dumping the cars a hook on a rope was placed on the rim of the car and the rope snubbed around one of the wooden ties to prevent the car from tipping over. In the power house the cars dumped into wooden triangular-shaped troughs and thence into chutes made up of wooden side boards within which were set semi-circular galvanized sheet metal troughs as needed.

#### ROCK EXCAVATION

All blasting for rock excavation is done at noon or at night. The rock is drilled with Ingersoll-Rand jackhammers and the air supplied with 2 Ingersoll-Rand portable and one Sullivan stationary electrically driven air compressors.

#### UNWATERING THE COFFERDAMS

The excavation within the cofferdam was kept dry by the use of 12 and 14-inch Goulds and Cameron electrically driven centrifugal pumps. Northey 12-inch steam centrifugal was also used. The cofferdam cribs were built of 3 x 8-inch plank instead of heavy squared timber. The initial cost was less but total cost slightly greater as there was no salvage, but money was saved in the long run by the cribs being very tight. It was sheeted with 2-ply 1-inch boards.

#### MISCELLANEOUS

This contract, which is about 2 miles long, required during the peak of the work, about 1,150 men, as follows: Lyall, 850; Gorman & Peckham, 160; Dominion Bridge, 75, and the turbine installation by owners, about 40 men. The Canadian General Electric also had a crew of some 30 men in generator installation. The work is flood-lighted throughout with electric lights for the night crew.

The Canadian Allis-Chalmers Co., and Dominion Engineering Works are each supplying 3 turbines. Dominion Bridge Co., is supplying all headgates, sluiceways and operating machinery and all structural steel. The Canadian General Electric Co., is supplying all generators and electrical equipment.

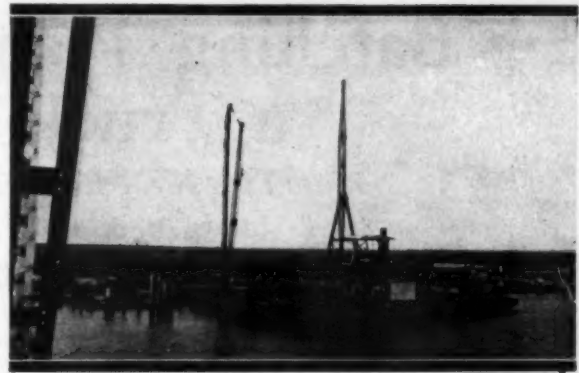
#### PERSONNEL

This \$9,000,000 project is being built for the Montreal Island Power Co. The Power Corp. of Canada is designing and supervising the project. P. Lyall & Sons Construction Co., is the general contractor for dams and powerhouse and Gorman & Peckham subcontractor for some of the structures.

### Complete Railroad Mixing Plant

(Continued from page 69)

This Project No. M039-14-C1 was awarded to the Globe Construction Co., of Kalamazoo, Mich., and W. M. Fagan, Vice President, acted as Superintendent. The work was done for the State Highway Department under the direction of R. A. Beers, Resident Construction Engineer with R. W. Rice as Project Engineer.



Equipment for Handling Steel for Rigolets Bridge

### Novel Method for Handling Steel on Bridge Erection

**B**ECAUSE of the delay in the shipments of the members for the trusses for the Rigolets Bridge on U. S. Route 90 from New Orleans east to Florida, a novel method was devised to permit the setting of the lower chords and the floor system before the traveler was erected on the floor system.

The Nashville Bridge Co., Nashville, Tenn., contractors for the steel erection, lashed two steel barges together and mounted the steel erector on cribbing amidships. Then with this outfit moored at a dock near the Chef Bridge a shore derrick loaded the steel on either side of the erector. The barges were then towed the 22 miles water distance to the Rigolets site and the steel erected by the derrick mounted on the barges. After the floor system was completed and the top chords and other members of the trusses were to be erected the derrick was moved onto the floor system and became a traveler such as is usually employed on this work.

This scheme saved the cost of dismantling the traveler and erecting it again on the bridge. It might have been used to set the top chords from the barge except that greater stability was needed for that work because of the gussets and large number of rivet holes to be matched up.

J. M. McMurtry was Assistant Superintendent for the Nashville Bridge Co. The general contractors for the Chef and Rigolets bridges was the Frederick Snare Corp., New York City. E. L. Erickson was Resident Engineer for the Louisiana State Highway Commission for both structures.

### States Improved 29,252 Miles of Roads Last Year

**A**CCORDING to a recent report of the United States Bureau of Public Roads, during 1928 the 48 states improved a total of 29,252 miles of their highway system, this being an increase of 2,530 miles over the 1927 figure of 26,722.

The 1928 total includes 8,675 miles of graded and drained roads and 20,577 miles of new surfacing. Of the roads surfaced 13,843 miles were previously unsurfaced and 3,587 were previously improved with a type of surface lower than the one newly applied. The remaining 3,147 miles were previously improved with the same type of surface and the work done during the year is therefore classed as reconstruction.

The total of 20,577 miles of surfacing placed is classified by types as follows: 1,200 miles of sand clay and topsoil; 9,623 miles of gravel; 1,006 miles of water bound macadam; 1,979 miles of bituminous macadam; 225 miles of sheet asphalt; 373 miles of bituminous concrete; 6,055 miles of portland cement concrete and 116 miles of brick and other block type pavements.

# Batching Plant Planned for a Truck a Minute

*With This Ideal Before Them, King Paving Co.  
Laid Out Plant With Many Devices  
to Save Time and Money*



MAKING use of a government gravel pit which had been worked before, thus preventing the development of the site for an entirely new set up, the King Paving Co., Ltd., of Oakville, Ont., used to a remarkable degree the natural advantages of the location to lay out its screening, washing and batching plant to serve the paver on its 7-mile concrete paving job running east of Elginfield, Ont.

The gravel pit, which is owned by the Ontario Department of Highways, was used without cost by the contractor. This is customary in Ontario work as there is a scarcity of good gravel in all except the western portion where most of the pits are controlled by one organization. Contractors bid the job knowing that they have the free use of the nearest government-owned gravel pit, but they have to work it themselves. Similarly, cement is furnished by the Department and is checked as received on the job by a government inspector.

## SAND AND GRAVEL PIT

In the pit, located about 350 feet back from the crushing plant, an Erie Type-B steam shovel loaded two trucks with the material which was hauled to the dumping platform above a bin which permitted regulating the flow of stone to the crusher.

## PRIMARY CRUSHER

After hauling from the pit to the hopper over the crusher, the load is dumped over a grizzly, separating the oversize gravel from the balance of the load. The sand and proper sized gravel is fed through a gate direct to the elevator buckets. The oversize gravel and boulders are fed to the primary crusher. This arrange-



Earth Cover for Cure on 7-Mile Concrete Road in Ontario

ment increases the output of the crusher. This hopper is equipped with a double grizzly, the top one of  $\frac{1}{2}$  x  $2\frac{1}{2}$ -inch iron bars with 2-inch spacers, and the bottom one of 2-inch pipe, spaced 2 inches apart. These grizzlies are at right angles to each other.

A gate in the side of the bin at the bottom was operated by one man while two others kept the material moving into the Acme jaw crusher. A bucket elevator raised the material from the crusher, which included all the sand as well as the stone and crushed material to the rotary screens where first the sand was screened out and allowed to flow directly to the washer. Then the sizes of stone permissible for Ontario specifications were screened out and the oversize run down a wooden chute with metal plates at the angles to the secondary crusher. This crusher was not installed in the original layout but as it was found that there was too much oversize material from the primary crusher the smaller Climax crusher was installed. All the stone from the secondary crusher was delivered direct to the stockpile by a small bucket elevator. The primary crusher was operated by a Case steam traction engine and the secondary crusher by a McCormick-Deering tractor.

The permissible stone from the primary crusher ran direct to the stockpile. While the elevations at the plant would have permitted running the crushed stone direct to bins from the screen it was thought better to lose this advantage in order to gain the value of a stockpile and use a Koehring crane with a 40-foot boom and 1-yard Blaw-Knox bucket as a means of loading both the sand and stone batching bins. Thus with a breakdown at the paver, stone and sand could still be run to the stockpile and with a breakdown in the crushing and screening plant the stock piles could still be used to supply the bins. In case of trouble with the crane the bins for the stone and sand were built of sufficient size to keep the paver in operation for some time.

Water for the washing operations in the Champion sand washer made by the Dominion Good Roads Machinery Co., was furnished by a Smart-Turner 6 x 4-inch centrifugal pump about 600 feet from the plant. The dirty water was returned to the stream after running over a bed of gravel which removed much of the silt.

## BATCHING OPERATIONS

Cement for the job was hauled by four trucks from the plant of the St. Marys Cement Co., a distance of 7 miles. As this was contract delivery at a definite number of bags a day, arrangements were made to store the surplus in any one day in a shed centrally located with regard to the cement loading operations. The storage also acted as a balance when the use of cement ran slightly over the contract delivery. At either side of the



cement shed were platforms on which the cement was stocked as delivered within the needs for the current day. At the center of each of these platforms was a pair of Monorails each with a bottom-dump bucket which held the 9 bags of cement for a single batch. These pairs of buckets were kept filled and as the trucks ran under them the bottoms were tripped and the cement flowed out over the batch. The cement was prevented from blowing by canvas flaps tacked to the doors of the bucket. The cement was delivered to the batch after the truck had passed under the stone batching bin and received the two batches of crushed material. Each bin was provided with two batchers consisting of wooden hoppers with controlling gates so that the minimum of time was lost in stopping the truck for its two batches.

One of the pairs of cement buckets had a timber running all the way from front to back to keep the two buckets from interfering with each other. The other pair had only a post to separate them and this proved more efficient as one man could push the two buckets out over the truck at the same time, without having to work his way over a central rail.

The trucks made three stops in securing the completed batch but as each stop was succeeded by a forward movement a truck was not in the plant for more than the allotted minute except under unusual circumstances. The ideal of "a truck a minute" was not lived up to but the few extra seconds, practically never amounting to more than 10 seconds extra, did not delay the work. The 15 batch trucks, each hauling 2 batches,

included 9 Hugs, 4 GMCs and 2 Reos. All trucks were equipped with 34 x 7 dual pneumatic tires on the rear wheels as it was found after sad experience with larger tires that these smaller ones lasted much longer in proportion.

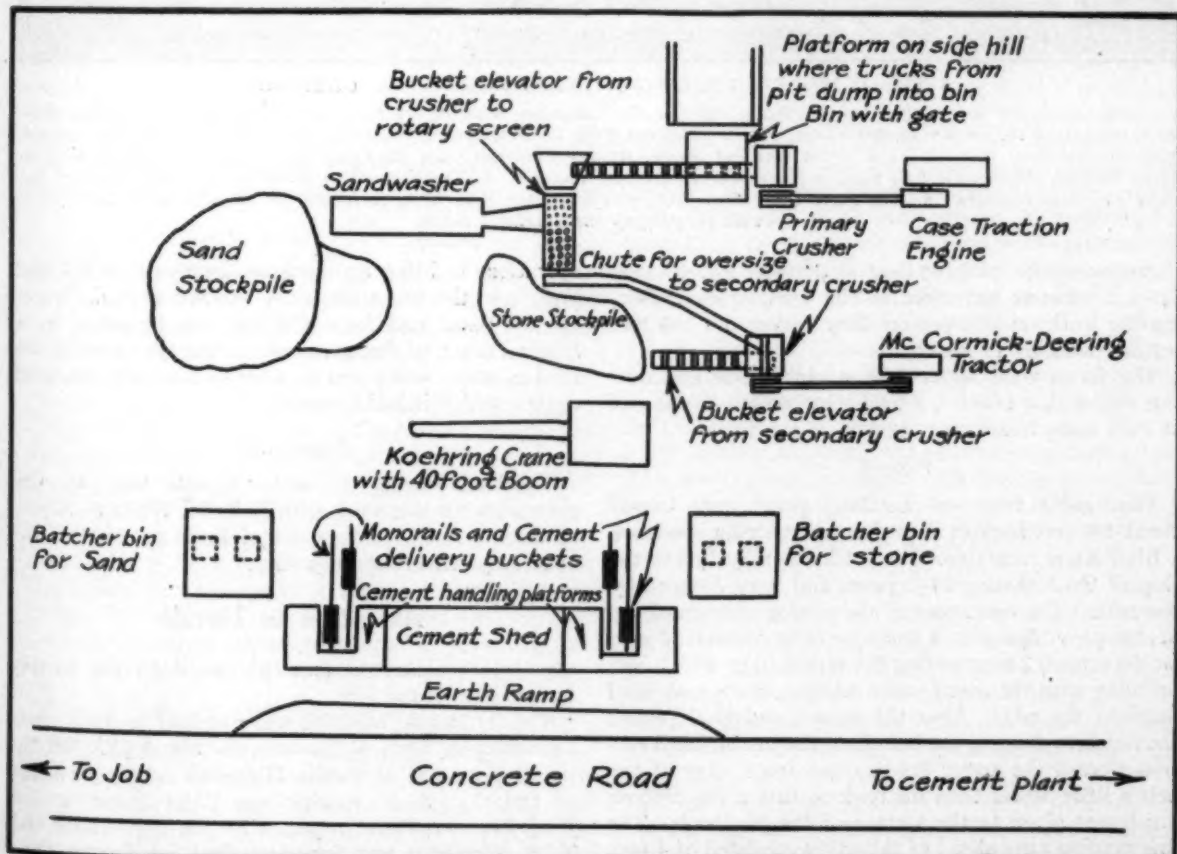
The dead haul to the paver varied from a minimum of 1 mile to a maximum of 8.5 miles.

A total of 92 men were employed at the plant including: 4 men temporarily used to strip the pit; 1 shovel operator, 1 fireman and 1 laborer on the shovel; and 2 truck drivers. There were 3 men used on the primary crusher and 1 man to operate the Case traction engine; 1 oiler for the screen and sand washer; 1 crane operator and 1 oiler; and a master mechanic and helper. In the cement house 6 men were used, usually handling 4,500 bags of cement a day from the shed to the boxes in addition to handling all deliveries by truck from the cement plant. Two men handled the two batchers. The master mechanic and helper had a small blacksmith shop with a welding outfit.

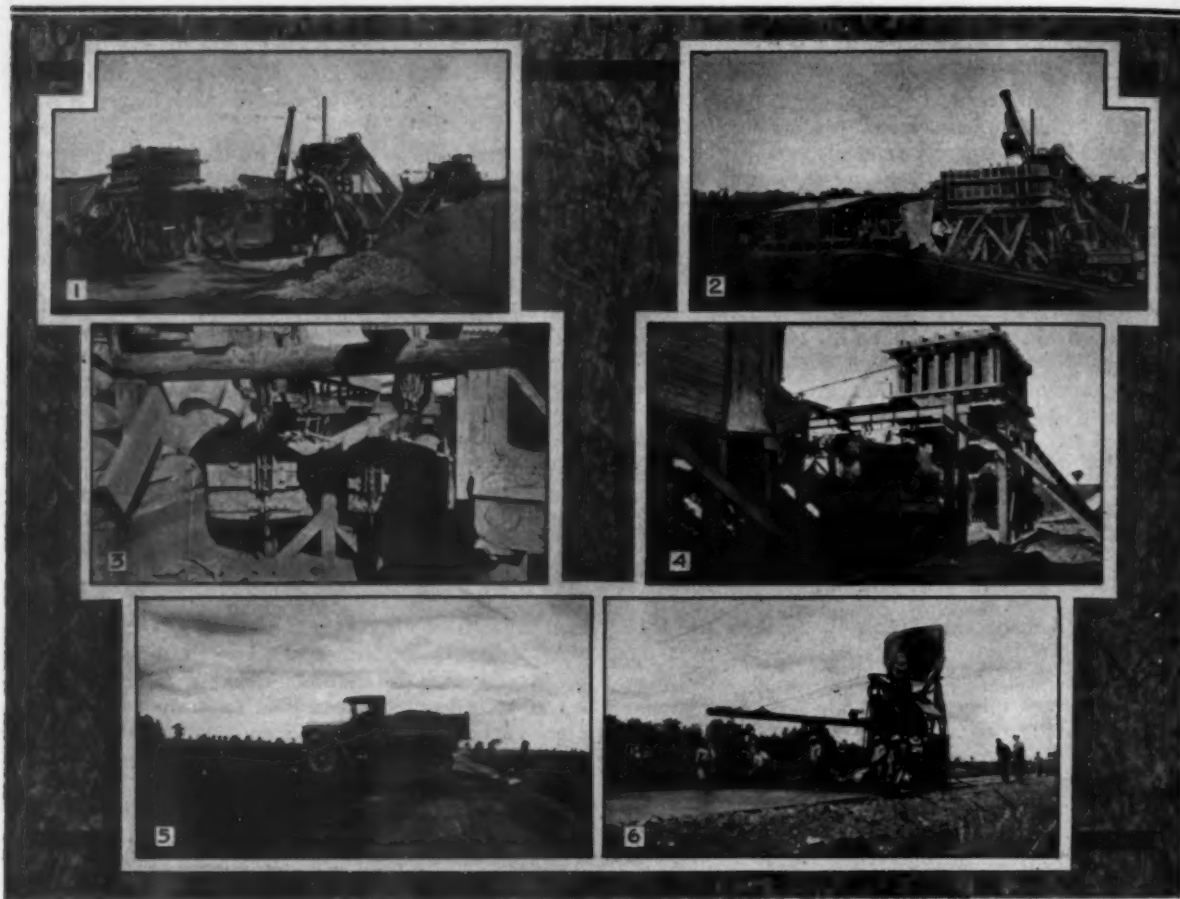
#### GRADING AND FORM SETTING

A Cletrac 75-horsepower tractor hauling an Adams grader was used for the rough grading followed up with a Wehr power grader on the fine grading. Wooden forms were used, set 500 feet ahead of the paver. The 2 x 10-inch dressed planks used for forms were set by a crew of 4 men and one man who oiled the forms well ahead of concreting.

The King Paving Co., is rightfully proud of its concreting crew which in the fall of 1928 established the



Plant Layout of King Paving Co., at Elginfield



#### WORK OF THE KING PAVING CO., NEAR ELGINFIELD, ONTARIO

1. The crushing and screening plant showing, at right, a truck dumping into the crusher hopper, then the bucket elevator to the screens, with the smaller bucket elevator for the material from the oversize crusher, the Koehring crane serving the batcher bins, and the stone bins. 2. View of the bins and cement storage platforms from the highway. 3. The dual cement bottom-dump buckets, showing the long wooden fence between the two buckets. 4. Truck receiving its load of cement between the stone and sand batchers. 5. Hug truck with batch being turned on the Blaw-Knox turntable. 6. The Koehring 27-E paver with the skip up and pouring a batch.

Canadian record of 2,063 feet of 20-foot, 10-7-10 inch 1:1½:3 concrete pavement in one working day. During the work on this project they averaged 1,160 feet per day working 11 hours.

The forms were set with iron pins inside and outside and with a 1-inch x 1-foot board nailed to one end of each form to act as a support at the joint.

#### PAVING

The trucks from the batching plant were turned about 150 feet back of the mixer by one man operating a Blaw-Knox turntable. The trucks then backed to the skip of the Koehring 27-E paver and were dumped by one man. The remainder of the paving crew consisted of: the paver operator, 4 men shoveling concrete, 2 men on the screed, 2 men setting the center strip, and 2 men finishing with the metal roller, belting, floats and hand finish of the edge. After the second and final belting the finishers dragged the belt from the last finished section toward the paver holding the front edge of the belt a little higher than the back so that a fine smooth finish was given to the surface of the pavement. The fine grading gang ahead of the paver consisted of 4 men shoveling.

A stone sled was maintained back of the concreting

operations to bring up forms as they were pulled, and pipe from the water line as it was not needed. Water for the paver and for sprinkling was furnished by a Smart-Turner triplex pump which was set up along the road as water was available so as to minimize the head against which it had to pump.

#### PERSONNEL

The King Paving Co., Ltd., Oakville, Ont., was the contractor for this work with E. V. H. White as Superintendent. A. H. Pitt was Chief Inspector for the Ontario Department of Highways.

#### Attention to Detail

(Continued from page 56)

constant check on the material issued for use on different parts of the job.

This 11.78-mile road job was awarded to the Rayner Construction, Ltd., of Toronto, for about \$300,000, by the Department of Public Highways of the Province of Ontario. S. E. Paisley was Chief Inspector and W. J. Latimer, Plant Inspector for the Department and T. B. Woodyatt was Superintendent for Rayner Construction, Ltd., of which A. W. Robertson is President and George Rayner, General Manager.

# Long Batch Haul Does Not Slow Up 5-Mile County Concrete Job

*Henkel Construction Co., Mason City, Iowa  
Handles First County Road Job  
Same as State Work*



MAXIMUM haul of seven miles to the far end of the job with a fleet of 22 International 1-batch trucks did not prevent the Henkel Construction Co., from laying an average of 1,880 feet of 9-foot pavement a day with practically every day broken by rain or by moves made neces-

sary by the number of bridges which were not included in the paving contract. The pavement slab was 6 inches thick, and had the usual Illinois reinforcement of a single longitudinal bar, placed 6 inches from the base of the slab and held in position by a spacer.

## PREPARING THE GRADE

The roadway over which this new pavement was built was an old oiled earth highway which had been built up over a period of years to about a foot above the grade. This excess material was loosened by scarifying with a Lakewood graderooter hauled by a Caterpillar Thirty and then removed with an Adams elevating grader hauled by a Monarch 75 tractor delivering the spoil to the trucks which hauled it away to fill and waste. The surface was rough graded by a small horse-drawn grader and then the grade was ready for the fine grade crew and form setters.

## FINE GRADING AND FORM SETTING

Well ahead of the form setters and fine grade crew the line for the forms was set and then cut by a Ted Carr form grader giving a firm foundation for the steel forms on which a Hug subgrade planer was run to shape the subgrade. The forms were set by a crew of 4 form setters with 2 helpers who kept every length of form on the job set ahead of the paver where it was physically possible. There were 4,000 feet of form on the job and at one time was the form crew less than 2,000 feet ahead of the paver.

The fine grade gang consisted of about 10 men who hand shoveled the earth thrown up in windrows by the Hug subgrade planer and placed it outside of the forms. A Hug steel scratch template was used to check the subgrade ahead of the paver before it was rolled with the Austin Pup gas roller.

## TWO PUMPS FURNISH WATER

Two C. H. & E. triplex pumps were installed along the job as small streams were available to furnish water to the paver and for sprinkling the burlap the first day of curing. A line of 2-inch pipe reached the full length of the job with taps every 200 feet for the hose con-

nection. The contractor had equipped the Koehring 27-E paver with a double hose connection so that there was never a moment when the paver was without water. This seems a small detail, but if a contractor counts the number of times a day that the paver operator has to yell, and that is putting it mildly, for water and holds up the paver for a few minutes he will find that an extra hose connection and extra hose will be very helpful in cutting down the lost time. The contractor does not cash in on his investment unless concrete is going into the road. There are times also when the pipe gang forgets to put in the valve where it belongs and there may even be 400 feet of pipe without a tap. When this happens the two hose lengths right at the paver help a lot to save time by simply coupling them together and stretching the distance to the next tap.

## UNLOADING AND BATCHING PLANT

There was nothing unusual about the unloading and batching plant except that there were a very small number of men to handle the loading of the string of trucks that were always standing there ready to receive a batch. The stone was received in gondola cars by rail from the Lehigh Stone Co., at Kankakee, Ill., and the sand came in the same way from Conkey Co., Mendota, Ill. Both aggregates were unloaded by a Brownhoist steam crawler crane with a Williams 1-yard bucket. Stockpiles were maintained at the batcher against any failure of rail delivery of materials. A Blaw-Knox batcher plant was used with volume measurements. The trucks backed under the batchers, received the stone and sand and then pulled out to the cement cars about 250 feet away where 6 sacks of cement from the Missouri Portland Cement Co., were dumped on the batch. No cement shed was maintained as the contractor was able to use the cement with sufficient rapidity so that there was no demurrage. This was made possible by using the average agreement clause with the railroad, whereby the contractor received credits for cars unloaded in one day which could be applied against demurrage on cars which were held over the usual demurrage period.

The fleet of 22 International trucks with Superior dump bodies handled the batches over the fairly rough grade speedily, turning through a breach in the forms. In order to protect the form trench two light platforms measuring about 2 x 4 feet were laid across the form trench during this time. A number of these same platforms were laid on the subgrade outside the forms where the trucks backed up to the paver, which ran the entire distance outside the forms, whenever the roadway was at all soft or slippery as is often the case with the Illinois clay when wet.



## CONCRETE RIBBON LAID RAPIDLY

Pouring 1,880 feet of concrete 9 feet wide and 9 inches thick on each working day and having a part of the day stolen by wet subgrade or by the time taken to move the paver across bridges, requires a well-organized paving crew. The Henkel Construction Co., has enough men for the work without their getting in each other's way in the 9-foot strip. There was a paver operator and helper who handled the hoses and dumped the trucks, 3 men shoveling concrete, 2 setting the center strip steel which was used at the side against one form to provide a key in case the concrete is widened to a full 18-foot road. These men also handled the placing of the longitudinal continuous rods, while 1 man oiled forms, 1 man operated the Lakewood finisher which made two passes over the concrete, the first with the screed and tamper operating and the second with the tamper and belt operating. There were 2 hand finishers who with a helper also spread the burlap over the finished concrete. The helper also sprinkled the burlap. One man on the second day removed the burlap and spread the calcium chloride at

the rate of 2 pounds per square yard for curing the concrete.

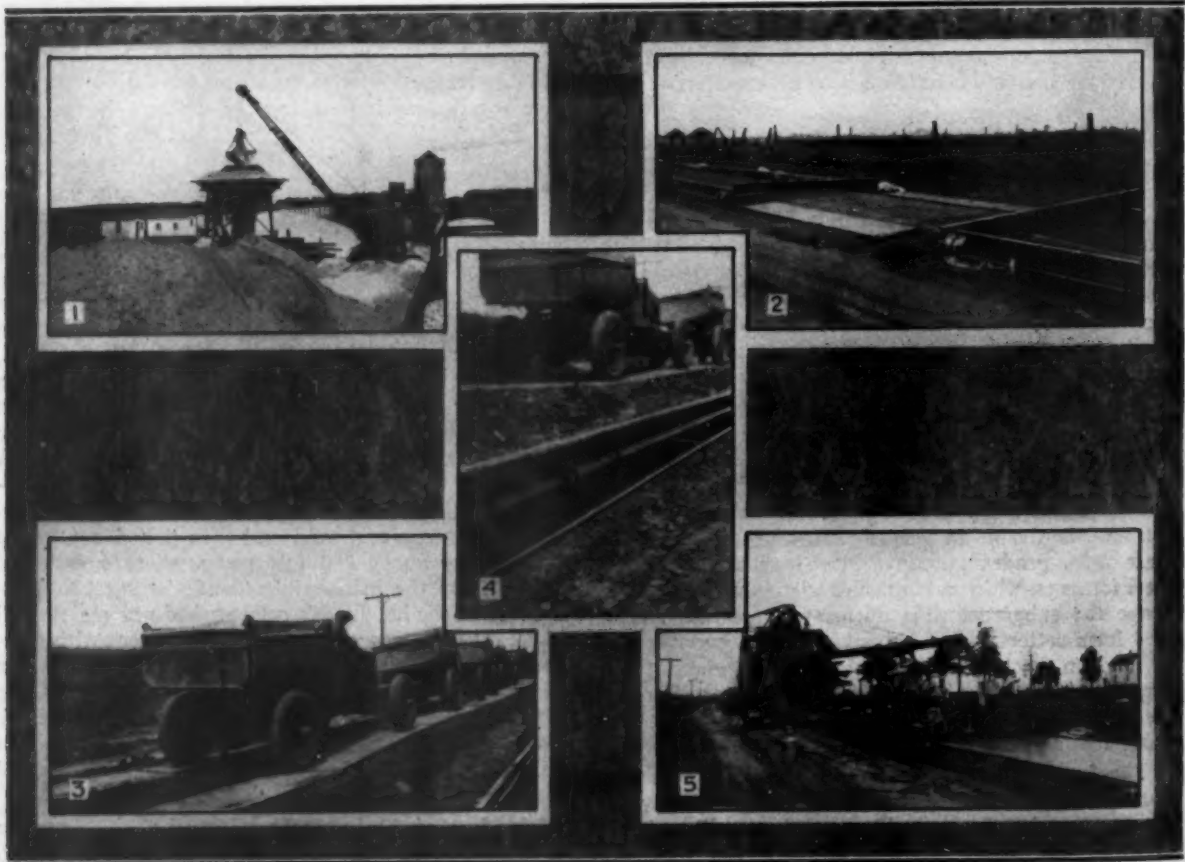
## CONSTRUCTION CAMP

The Henkel Construction Co., has a complete camp of wagons of which 19 were used on this job. There were 10 bunk wagons, 1 kitchen, 2 dining wagons, 1 office wagon, 1 tool wagon, 1 commissary wagon, 1 bath house, 1 wash house, and 1 club house containing reading matter and a radio. At noon all the men were taken to the dining wagons and the job shut down completely.

## PERSONNEL

A. Thorsen was Superintendent for the Henkel Construction Co., in charge of grading and paving with H. Bruns as Foreman at the unloading and batching plant. Glenn D. Butzer is County Engineer in charge of the work for Livingston County.

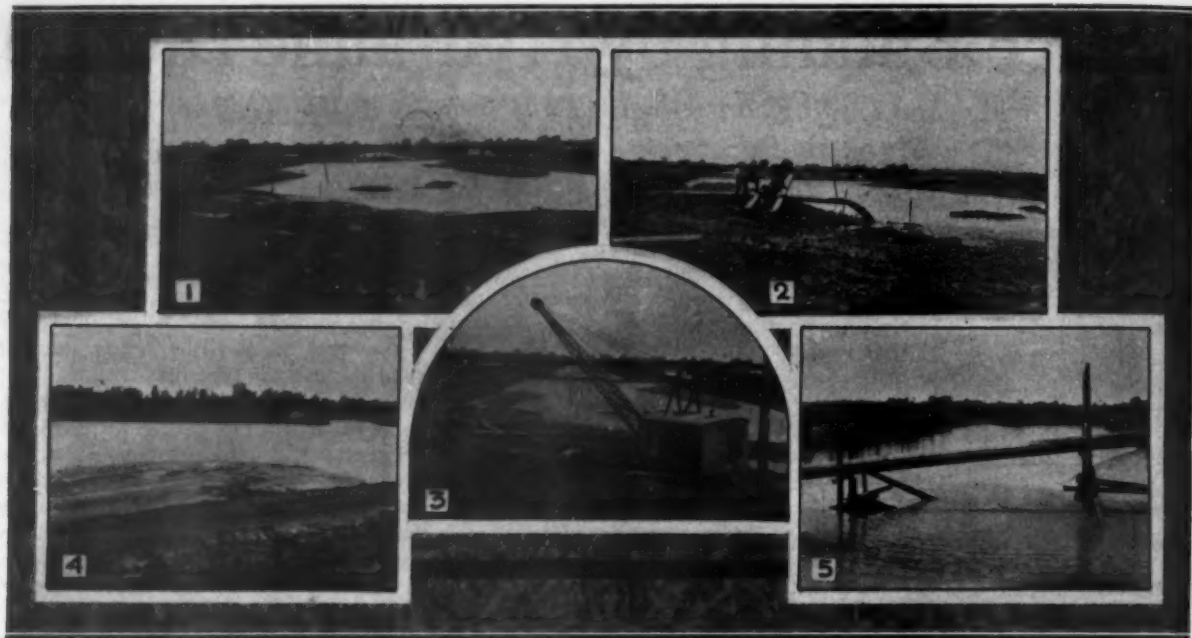
*Here is why some accidents occur: The human brain is a wonderful organ. It starts working the moment we get up in the morning and doesn't stop until we get to the job.*



### HENKEL CONSTRUCTION CO., TOOK GOOD CARE THAT ITS EQUIPMENT DID NOT GET STUCK IN THE ILLINOIS MUD

1. The batching plant with the camp in the background. Brownhoist steam crane loading the Blaw-Knox batchers. 2. A place was provided for the trucks which were driving down the old road to turn into the new grade to prevent their becoming mired in the ditch at the side of the narrow road. The planked strips were placed over the form trench so that there would be no need to prepare the trench again when the form was replaced. 3. Trucks running on the planked strips on a soft section of the old road. It kept the trucks running at times when a few soft places would have tied up the entire job. 4. Side rods and the center strip fastened to the forms at the side to provide a key when the road is widened at some future date. 5. The Koehring paver and Lakewood finisher which kept everyone busy by setting a lively pace. When a bridge was to be crossed the paver set out ahead and the finisher was skidded over on a special frame built for it to save time.





#### OPERATIONS NECESSARY FOR THE ECONOMICAL BUILDING OF LEVEES BY HYDRAULIC DREDGE

1. The ponds where the clay and silt from the dredge pipe settles in a 3,000-foot flow through the levee between the dikes. 2. Discharge of the 10-inch dredge. 3. Northwest dragline making dikes at the end of the hydraulic fill section using the ramp of the completed section for the material. 4. The place where the silt broke through the dikes and flowed for a considerable distance into the riverside borrow pits. 5. The leak in the pipe line showing faintly the difference in the water from the pipe and the settled water.

was run in and trimmed the slope of the outside of the dikes to the required  $3\frac{1}{2}$  to 1 riverside and 6 to 1 land-side slope, using the material for the forming of the second lift dike. When additional material was needed for this lift the earth was taken from the inside of the levee section, where it had been deposited by the dredge.

#### CONTROL OF DEPOSITION OF MATERIAL

The greatest deposit of material is of course at the point where the pipe discharges. Here the buckshot clay piles up when there is a big load of this almost 100 per cent pay dirt. After this and a short distance from the pipe the sand and farther on the loam are deposited. The finer material which is in suspension is made to settle out by forming lagoons in the levee section and cutting small sluices through. The slow flow of the water through the lagoons causes the material to settle, but it is not until the borrow pits are reached that the water loses most of its burden of silt.

An interesting comparison of the water as it entered the levee section and the water that had settled could be made where the dredge pipe crossed the borrow pits and one joint was leaking. The water heavily laden with silt dropped into the comparatively clear water making a distinct contrast. The water travels about 3,000 feet in the levee section and then another 3,000 feet in the borrow pits.

In one place where a dike broke the fine material from a section of the levee where an experiment was being tried flowed rapidly to a lower section in the borrow pits. The experiment was to permit the finest silt to settle out in the levee forming at the base a layer of almost impervious material which would put a stop to seepage, the curse of the levee engineer's life. It was

found that when this material was deposited and then the heavier buckshot pumped in that the lighter silt was simply displaced. It was then permitted to dry out before the buckshot was pumped in and the results were more satisfactory.

#### ONE SECTION HANDLED BY TRACTORS AND WAGONS

Fourteen stations on this contract were subbed to Uzelle & Rodgers, Memphis, Tenn., who used Caterpillar Sixties and  $7\frac{1}{2}$ -yard crawler wagons. At the connecting point between the two methods of handling the work Wilbanks & Pierce used the long ramp necessary for the tractor and wagon outfit as material for the dikes, handling the dirt by dragline.

#### OPERATING EXPENSES

A dredging outfit has about the minimum expenses as far as labor is concerned. The Wilbanks & Pierce contract was handled by 40 men working in three shifts on the 2 dredges and the 2 draglines. A total of about 600 gallons of fuel oil was used per 24 hours for the two dredges.

This job was bid in at 22.9 cents per cubic yard for about 650,000 yards, while a similar section of 650,000 yards to the east was bid in at 28.9 cents by the same contractors.

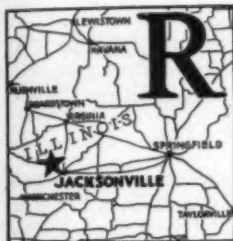
#### PERSONNEL

The Rosedale Area or Northern Area, Vicksburg Engineer District, is in charge of E. S. Maupin. Capt. D. H. Mason was in charge of the dredging operations for Wilbanks & Pierce. John R. Wilbanks is President, R. C. Pierce is Vice President and Chief Engineer, and H. W. Nugent, General Manager.



# A Well-Balanced Organization Makes High Average for Concrete Poured

*No Excess of Labor, Carefully Chosen Equipment,  
Able Foremen and a Unique Hose Connection  
Average 1,278.7 Feet Per Day*

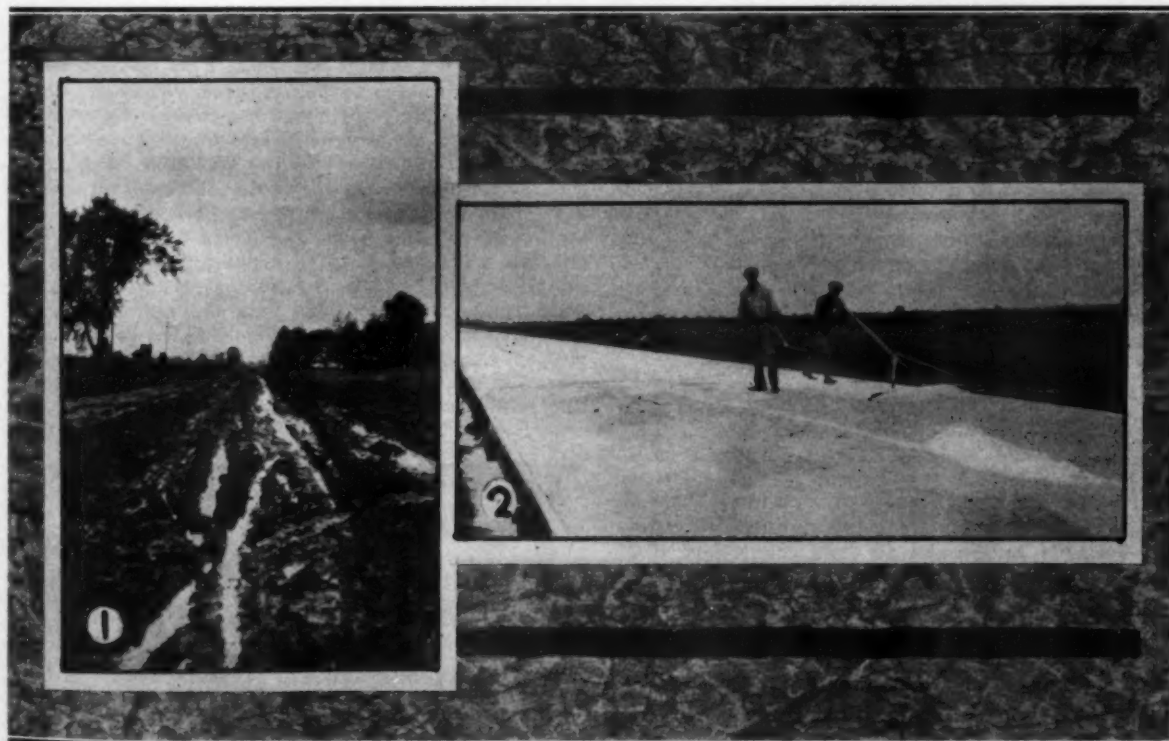


RAIN may delay the actual pouring of concrete on a Cameron, Joyce & Co., job but when the subgrade is dry, and every effort is bent to get it into shape after a rain, then every man is on his toes and the Superintendent sees to it that nothing delays production. When the job at Jacksonville, Ill., was visited the only thing that could move with any degree of speed was a Ford coupe belonging to the concrete foreman, J. P. Hassett. Mud clung to the shoes of those who walked until the pedal extremity was twice its normal size. A grading gang

was out on the subgrade cutting channels here and there to drain the water as rapidly as possible so that the grade would be dry as soon as there was a wind or sun to remove the excess moisture.

## EQUIPMENT IN SHAPE AND READY TO GO

All equipment was ready on the grade or in the yard protected from the weather as well as possible and ready for the word to go into action. A Caterpillar Sixty was being groomed by its operator in the spare moments provided by the rain, an Adams elevating grader stood close by ready to take up its task as soon as the clay was dry enough not to stick to the belt and make a complete circuit with the belt. A Russell patrol grader hauled by a team was smoothing up the grade,



## ALL WORK BUT CURING CEASED DURING WET WEATHER

1. A view of the subgrade of the Cameron Joyce & Co., job north of Jacksonville, Ill., the morning after a heavy thunder storm. The sticky clay in the foreground would adhere to a man's shoes until his pedal extremities were twice their normal size. This photograph might well be titled "Game Called On Account of Wet Grounds." 2. The only activity on this job during the wet period was the spreading of calcium chloride on the previous day's pour of concrete by using an old float which left a very uniform layer of the chemical on the surface.

filling the ruts that the last trucks had formed in getting out from the paver after the down-pour started. A Fordson with concrete-filled wheels stood on the subgrade right where it had stopped rolling and behind it was a Lakewood subgrader turned to let the last trucks by. The Ted Carr formgrader was at the end of its path with the even grade formed right up to the cutting blade. This had formed a channel for a large amount of water to move down grade and off the right of way as shown by the scour marks. But clay is quite tough material and does not wash out like lighter soils so there was little damage done. The Blaw-Knox turntable stood on the finished grade patiently awaiting the arrival of the first truck to give it a ride and start it back to the Koehring 21-E paver. The Metaforms were still in true line ready to support the Lakewood finisher in its travels over the freshly poured concrete when operations were resumed.

Workmen were busy spreading 3-C calcium chloride over the previous days pour of concrete. The men rolled a drum of the chemical with the head open and the white curing agent ran out on the road. A man with a shovel followed and cast the granular material to the right and left. Then a man with an old float pushed the excess chemical up and down the pavement until the surface was a uniform white. This seemed a very quick and easy way to distribute the chemical and the results were reported as almost 100 per cent according to the specified amount, 2 pounds per square yard of pavement. Any error was in excess of the curing agent and thus in favor of the pavement.

#### NOVEL HOSE CONNECTION

We have told in these pages several times of the double connection used by some contractors at the paver. J. P. Hassett made a new connection on this job that has a number of advantages. He claims in the first place that he has not lost a batch in time with the device and it does save time in making the connection. Instead of the usual hose couplings Mr. Hassett has substituted air brake hose connections on the water line tap and on the end of the paver hose that is connected to the tap on the line. Thus the same hose is used all the time and is never disconnected from the paver. With the air brake hose on the tap being used and another on the next tap all is set for the shift. When the hose is reaching the end of its usefulness from one tap the concrete foreman gives the signal for the fine grade gang to shift hose.

When the skip goes up and the paver man opens the water valve to the drum which automatically shuts off the inlet, a man at the tap to which the hose is connected simply breaks the air hose connection, while another man closes the valve on the water line. About 7 men grab the hose and run as fast as they can to the next tap where a man grabs the air hose on the end of the water hose and makes up the connection almost instantly with the air hose on the tap.

#### THE ROAD CREW

The crew which has made possible the high average of finished 18-foot, 9-6-9-inch section pavement per day has comprised: 4 teams on grade, 1 hauling forms, 6 men setting forms and making up the fine grade assisted by the Ted Carr formgrader and an Adams grader; 3 men on fine grade at the paver behind the

Lakewood subgrade planer; 1 man dumping the trucks and handling the hose; 1 paver operator; 2 men shoveling concrete and to the finisher; 1 spader; 1 finisher operator; 2 hand finishers who edge the slab and do the hand belting; and 2 men who spread the burlap, sprinkle it and assist in moving the hose. The hose is 200 feet long and the distance between taps on the water line, 375 feet.

#### THE HAULING FLEET

The fleet of trucks which hauled the batches from the concrete batching plant consisted of 6 International trucks, 3 Master 2-batch trucks, 12 Ford trucks, and 1 Dodge truck on trial. When hauling the maximum distance this fleet has been augmented with 15 other trucks with their operators.

#### THE BATCHING PLANT

Sand and gravel for this job were received by rail in gondola cars and unloaded to the Johnson bin and batchers by an Industrial steam crane with a Blaw-Knox bucket.

#### PERSONNEL

T. H. Joyce, Jr., was Superintendent for Cameron-Joyce Co., Keokuk, Iowa, on this job and B. Atkin was Resident Engineer for the Illinois Division of Highways.

#### A.G.C. to Catalog Construction Companies

**T**HROUGH the newly incorporated Bureau of Contract Information, the Associated General Contractors of America is to undertake the work of gathering and compiling business histories of some 26,000 firms listed as construction companies under the direction of S. M. Williams. Data on the manner in which each general contractor in the United States has fulfilled past contract obligations is to be gathered and utilized in an effort to eliminate conditions which have made for irresponsibility in the construction industry. The undertaking is a venture in cooperation between surety companies and organized contractors, although it is independently organized as a facts finding and investigating agency.

The highway departments of 46 states have gone on record as favoring the objects of the Bureau and have pledged assistance to the extent of contributing their own data on the performance records of those contractors who have worked under contract for them. Individual surety companies, interested in the Bureau, have likewise agreed to pool their records. Questionnaires are rapidly being forwarded to contractors in order to obtain data direct from them, as to their past performance and qualifications.



*The First Bay City Tractor Shovel Delivered in Switzerland  
Sold by a Zurich Distributor*

# Curing with Asphalt on Arkansas Concrete Road Project

*T. S. Clements, Shreveport, La., Dispenses With Earth Cover  
for Curing Arkansas Paving Section 380  
Southwest of Malvern*



THE specifications of the Arkansas State Highway Commission permit the use of ponding, earth cover or spraying with asphalt for the curing of concrete pavements. T. S. Clements in handling the work on Section 380 between Malvern and Donaldson, Ark., elected to use Curcrete as the

curing method. This involves the spraying of the finished slab with an asphalt emulsion as soon as the water has left the surface of the slab. The sides of the slab were banked with earth as soon as the forms were removed. In case of rain immediately following the pouring of the concrete it was covered with burlap which was kept on the job for this purpose. The pavement was opened to traffic 21 days after pouring.

## MATERIAL HANDLING AT UNLOADING PLANT

The contractor was fortunate in having a railroad siding available for handling 30 cars of aggregate and cement. Both sand and gravel were received in gondola cars from the Standard Gravel Co., Antoine, Ark., and were unloaded by a Northwest crane with a 1-yard Owen clamshell bucket. The stockpiles of sand and gravel contained about 20 cars of gravel and 10 cars of sand. An average of 10 cars of gravel and 5 cars of sand were used per day when running normally. The job was held up for a period of nearly three weeks in July because of non-delivery of aggregates.

Cement was received by rail from the O. K. Cement Co., Ada, Okla., and was handled by 4 men in the car direct to the batch trucks whenever possible. A cement storage shed was used to maintain a reserve stock of about 3 cars of cement.

The crew at the batching plant consisted of 2 men in the cars spotting the bucket and cleaning up, 1 crane operator, 2 men on the batcher, and 1 man on the sack shaker and baler.

The fleet of twelve 3-batch Sandow trucks handled all the hauling of batches. They backed under the Johnson weighing batchers and then after receiving the three batches ran to the cement car and had the 6 bags of cement tossed onto each batch. The bags were opened and dumped by two men on the batches after the trucks had been turned on the large Blaw-Knox turntable.

## GRADING AND FORM SETTING

Following the example of Tennessee, Arkansas grades a new location for a state highway by contract the year previous to its paving. This permits better

bids, as contractors specializing in grading will bid on the work and also permits the grade to settle and all fills to stabilize before paving is started. The roadway is gravelled so that the road is almost as good as the state and federal routes maintained as gravel roads. By this procedure the paving contractor has only to fine grade the section and set the forms prior to paving.

T. S. Clements used a Caterpillar Sixty with a Lakewood road rooter to loosen the surface and then bladed the material to approximate section with an Adams 12-foot blade grader and rolled it with an 8-ton Austin 3-wheel gas roller.

The Metaforms were set from 1,150 to 1,200 feet ahead of the paver in specially prepared trenches run to grade. The form setting and fine grade crew consisted of 2 form setters, 1 tractor operator, 1 grader operator, 1 roller man, 2 teams with fresnos and drivers, loader and dumper, 1 man for the Lakewood subgrader with help from the freso operators, and 1 man on the turntable. One foreman had charge of this work. A total of 5,000 feet of forms was maintained on the job.

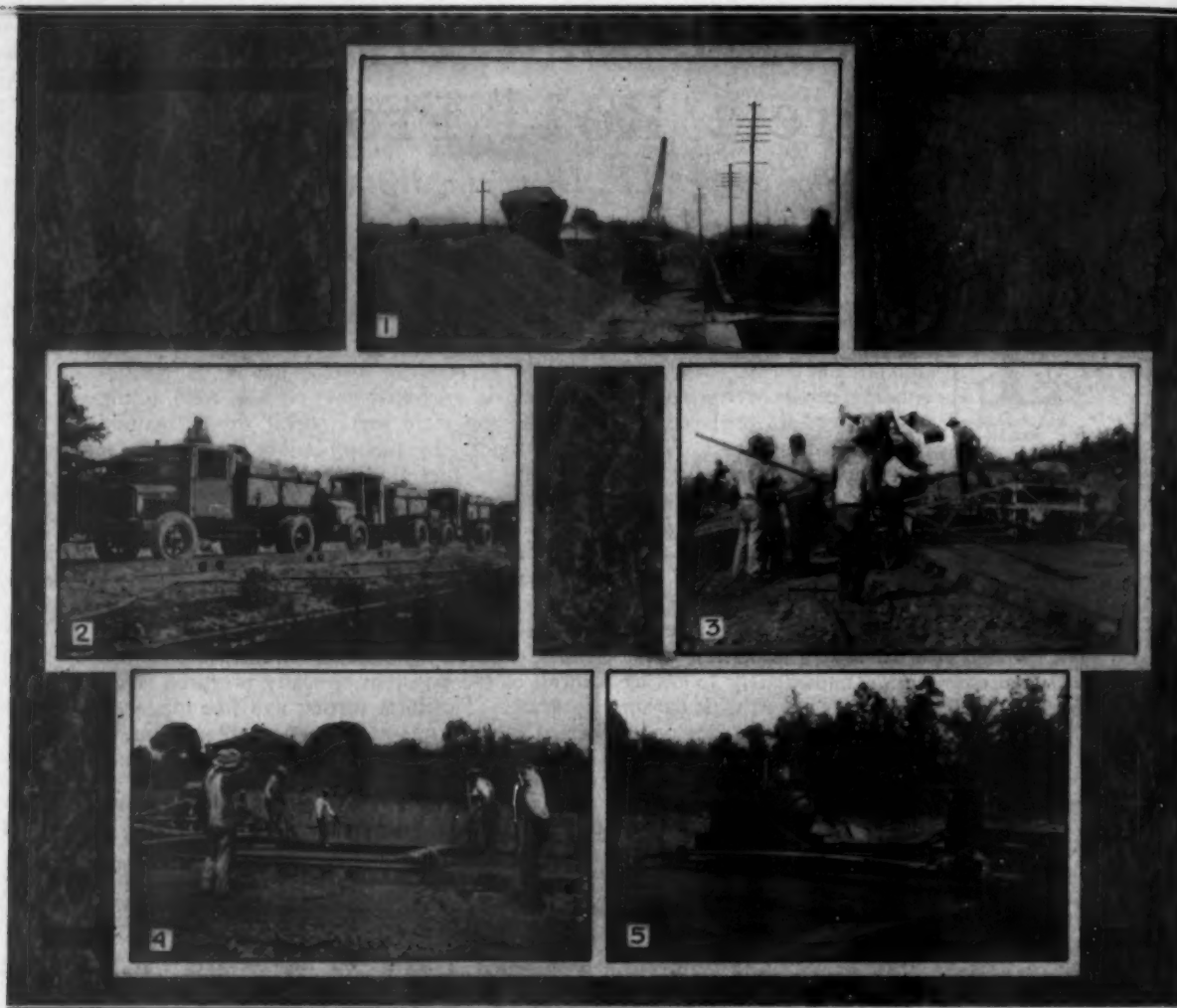
## PARABOLIC CROWN REQUIRED ON PAVEMENT

The Arkansas specifications require a parabolic crown of about  $1\frac{3}{8}$  inches on the concrete slab with the standard Bates cross-section for the slab, 9 inches thick at the edges and 6 inches thick at the center. Slight trouble in adjusting the screed on the finisher caused some delay in the operations but this was satisfactorily adjusted and normal speed resumed when material deliveries were up to schedule. The contractor averaged 800 feet of finished pavement per day with 35.18 cubic yards of concrete per 100 feet of pavement, using a 1:2:3½ mix.

The concreting crew consisted of: 1 man to dump trucks; 1 paver operator; 4 puddlers who also set the side rods, 2 of these are used in Arkansas on each side of the slab, these same men also setting the dowels at the expansion joints; 1 operator for the Lakewood finisher; 1 man setting the Truscon center steel; 2 men shoveling from the Koehring planer attached to the Rex 27-E paver; 3 hand finishers who used the small floats, the edgers and checked the pavement with a Lakewood metallic straight-edge. These men also gave the pavement its final belting. All high spots in the pavement before final set began were ironed out with a 16-foot longitudinal float operated by 2 men from a double Heltzel bridge mounted on rollers on the forms.

A small Heltzel bridge was used to store the supply of Curcrete for curing the road and the small gasoline-operated air compressor which supplied the air for the spray.





#### WORK ON ARKANSAS PROJECT SECTION 380 BETWEEN MALVERN AND DONALDSON

1. The unloading and batching plant showing the 30-car siding. 2. A lineup of Sandow trucks with batches ready for the paver. 3. In foreground, hand floating the finished slab. In background, the Lakewood finisher and the Rex 27-E paver. 4. Longitudinal float from the twin bridge running on the forms. 5. The Curcrete outfit mounted on a small Heltzel bridge.

#### EXPANSION JOINTS

Expansion joints  $\frac{3}{4}$ -inch wide were placed every 50 feet in the slab by inserting two header boards of one-half the width of the pavement, or a total of 4 boards. These were removed as soon as the concrete began to set and after the finishing process was complete. The joints were then poured full with hot Texaco asphalt. The header boards were of steel plate slotted at the proper places for the connecting dowels across each joint. There were three dowels on either side of the center strip.

#### WATER SUPPLY

The 10.8-mile project was started at about the mid point between Malvern and Donaldson with the batching plant set up at Donaldson. After pouring to Donaldson the plant was moved to Malvern and the remaining section poured from the first section of slab toward Malvern. For the first section water was supplied from a small creek for a portion of the distance and then the pumps moved to reduce the head. A Durex and a Gardner pump were used and moved twice. The pipe was  $1\frac{1}{2}$  inches in diameter and the

taps inserted every 225 feet in the line. Two sections of  $1\frac{1}{2}$ -inch hose were used for the paver totaling about 250 feet in length.

#### PERSONNEL

The contractor for this work was T. S. Clements, Shreveport, La., with Roy Baker as Superintendent.

#### Safety

“SAFETY is a simple problem, but the achieving of simplicity is a virtue denied to all but the chosen few. Safety in industry or for the individual is not a question of bulletins or slips in the pay envelopes, nor of talks by superintendents, nor yet of campaigns or slogans for it is, as an idea, accepted by us all. The problem is to have the individual recognize his own responsibility through, if need be, actual coercion. The responsibility for safety in any organization rests upon the head of that organization, who must to this end exercise unceasing vigilance. Failure to observe or cooperate in safety should be as definite a mark of incompetency for a job as failure to produce results in the accepted channels. The day is coming when a business must be physically safe for its workers, not through tears or exhortations or orders, but by requirement of the management.”

—Electrical World.

# A Complete Floating Concrete Mixing Plant

*The Vicksburg Engineer District, Central Area,  
Operates Plant for Casting Revetment  
to Replace Old Willow Mats*



FOR the first time in the history of revetment work in the Vicksburg Engineer's District on the Mississippi River no willow mats will be made during the present season to place at critical points along the shore to prevent bank erosion. Instead the articulated concrete mats made at

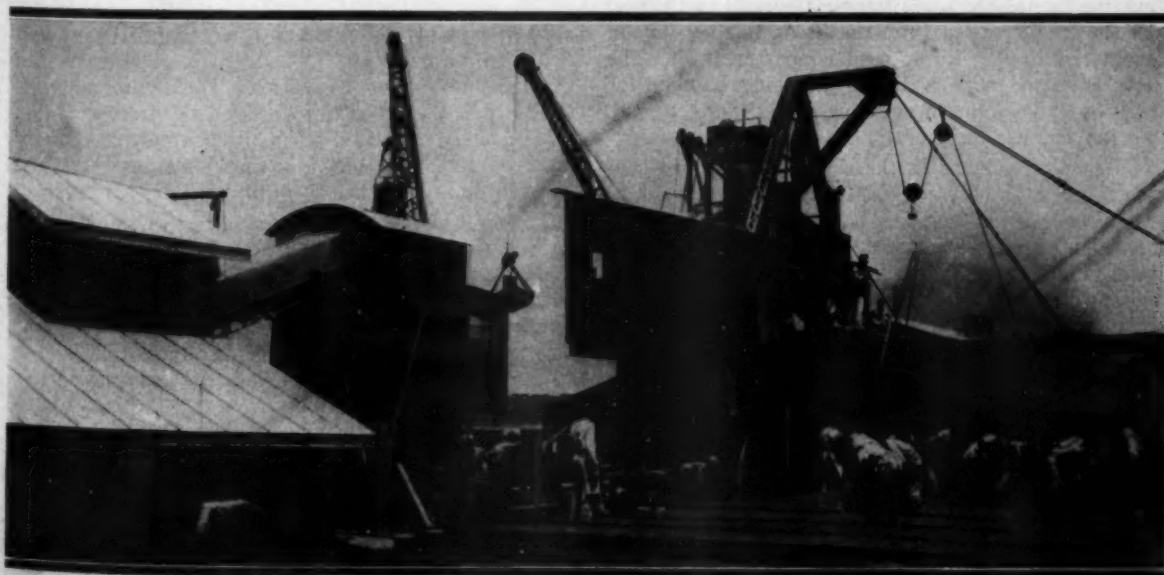
the casting plant at Greenville, Miss., will be used for this work entirely. Willow mats have proved entirely successful where they remain under water at all times. Unfortunately, they must be laid at places where the scour is the worst at high water but they are exposed to the air and sun when the water recedes. This gives opportunity for the mats to rot and their effectiveness is lost. The concrete mats have proved so effective and cheaper to manufacture that they have replaced the older type.

The mats are made of strips of reinforced concrete slabs each measuring 1 foot wide by 4 feet long and 3 inches thick. Each strip is made up of 25 slabs, spaced approximately 1 inch apart, making the strips as cast about 25 feet long, with an area of 100 square feet. This unit is commonly known as a square. The reinforcing is a heavy galvanized wire with a heavier wire on the outside of the form, which is used as a means of clipping the adjacent strips to the 7/16-inch

cable by which it is lowered to the river bank to protect it from scour.

## THE FLEET

The entire operation of securing the aggregates, proportioning them, mixing the concrete, casting the strips and storing them is carried on by means of properly equipped barges. A floating dredge gathers the sand and gravel for the plant from the river a few miles above Greenville, and the aggregate is transported to the mixing plant in barges divided into two compartments in approximately the proportions it will be used. One barge load of aggregates produces between 200 and 250 squares of concrete slabs. The cement is shipped in from the plant receiving the contract for furnishing it and transferred from the freight cars to the cement barges by Mathews roller conveyors. Each of the two cement barges will store about 8,000 barrels of cement. Another barge is the unloading plant for the aggregate barges, the proportioning plant and the mixing plant. There are 100 barges used for casting the mats, and they are used in groups of 10 in front of the mixer barge. Another barge is used as a carpenter shop where two men repair the few remaining wooden forms used for casting the strips, and mend the barges as needed and any other work of this nature needed in the fleet. There is one carpenter's helper. Another barge is used for sack shaker equipment, the recovered cement being bagged and returned to the cement barge. This section of the barge



*A View of the Concrete Mixing Plant from the Casting Barge*

is equipped with a Handy Sack Baler Co. shaker and also a baler. The other section of this barge is used for the storage of the large rolls of paper which are cut up into 25-foot lengths and rolled for use between the strips when cast, thus saving the need of special bottoms for each set of forms.

In addition to this fleet of dredge and barges there are 6 barges for the sand and gravel alone and a steamboat and a tug. A group of 6 spar barges is used along the shore as buffers for the sets of 10 to 20 casting barges which are tied to them during the concreting operations. A line gang of 6 men handles the spar barges and takes care of all fleet work such as moving the cement barges as needed and the aggregate barges as they come and go.

#### THE CEMENT BARGES

The two cement barges having a capacity of 6,000 bags each are covered with galvanized roofing and sides. Each barge has two Barber-Greene 60-foot portable conveyors. The first conveyor has an elongated hopper continuing along a good part of the length of the belt into which the bags of cement are emptied as needed to fill the cement storage bin on the concreting barge. The first conveyor empties onto a second which carries the cement up into the bin. A crew of 4 men handle the belts, bags of cement and cleaning up on the cement barge.

#### THE CONCRETING BARGE

The concreting barge is probably of most interest to contractors as there are many cases where a well-designed floating concreting plant is a valuable asset to the contractor on a bridge foundation job. The plant used for this work does not deliver the concrete at a high elevation but could be easily arranged to deliver to a tower and elevator on an adjacent barge where it might be necessary to distribute the concrete over a large area.

Two Industrial-Brownhoist locomotive cranes with  $\frac{3}{4}$ -yard clamshell buckets mounted on a track running along one side of the barge handle the sand and gravel from the barges towed from the dredge. They unload the material into the Butler steel compartment bin. The bin is equipped with a Butler weighing batcher for the gravel and a Johnson weighing batcher for the sand. Each batcher has an operator.

The cement received in the cement bin on the concreting barge from the cement barge is batched or weighed in a Butler weighing batcher and dumped into an Atlas industrial railway car equipped with an electric motor taking current from three separate take-off tracks independent of guide rails for wheels. The cement car and another similar car handling the sand and gravel from the weighing batchers alternate at the skips of the two Lakewood 1-yard building mixers. The cement is dumped first followed by the aggregate. One man is used on each car and one man operates the cement weighing batcher while another helps dump the cars at the skips. An oil burning boiler is installed on the water line to the mixers to permit heating the water during the cold weather to give the best results. The aggregate is heated by live steam vents in the pipe, which maintain the aggregates at 65 degrees Fahrenheit.

The skip of the mixer lifts the batch 20 feet to the drum. The mixers are located about amidships but at the side of the barge. A batch of material as delivered to the mixer approximates the following proportions: 340 pounds cement, 1,720 pounds gravel, 1,250 pounds sand. These proportions are varied with each barge load of aggregate received to give the best results. The batch is given a 1 minute and 20 second mix. This time is not necessary as a 1-minute mix has been found to give ample strength for the use to which the concrete is put. The longer mix was used as there was no speed necessary during June and July when the water continued high in the river preventing the grading of the banks for the concrete revetment. When in full operation using two 8-hour shifts and a 1-minute mix the plant produces one completed strip every 45 seconds. It was the aim of the foreman of the plant to have all 100 barges filled by the time the concrete revetment parties were ready to place the mats. In this way he would have sufficient time to permit the mats to cure amply before they were needed. The mats to cure amply before they were needed.

In addition to the operating crew mentioned thus far there is 1 man who sits under the mixers and controls the movement of the entire concrete barge, to which is tied the cement barge, along the fleet of 10 casting barges tied up to the spar barges. A 1-inch steel cable is run to either end of the casting fleet and through a winch on the concreting barge controlled by the operator under the mixers. It is necessary to move the plant constantly although it is not in continuous motion. As each strip is poured the plant is moved so that the distributing bucket is over the next strip. There is one operator for each of the Lakewood mixers, and one man on the hopper in front of each mixer. Two men ride the electrically controlled Lakewood concrete bucket which spreads the concrete in the steel or wooden forms in which the reinforcing mesh has been placed. There is one man on the deck of the concreting barge to clean up spilled aggregate or concrete and to assist the operator in moving the barge when necessary.

#### A TYPICAL CASTING BARGE

The strips of 25 individual reinforced slabs are cast 20 strips to a barge and 15 high on the steel barges and 13 high on the wooden barges. The reinforcing wire used is not welded as it was found by experience that the welded bond rusted out while the ties made of the same kind of wire as the reinforcing do not rust out under ordinary conditions during the life of the mat.

The first set of forms are placed directly on the deck of the barge with a sheet of kraft paper between the deck and the concrete. This is oiled by two men with sprays connected to a tank of the same oil as is used for fuel in the power plant of the concreting barge. The reinforcing which comes in rolls and is cut to fit the strips is placed, then the forms on top. The reinforcing is held up from the bottom of the form by an ingenious device which takes the form of a pin with offsets welded to it within the hollow section of the form. When the pin on the outside is pulled out holding the outside wire which clips to the placing cable, three offset pins across the form slide out and support the wire within the form between individual slabs. Soon after the forms are oiled the



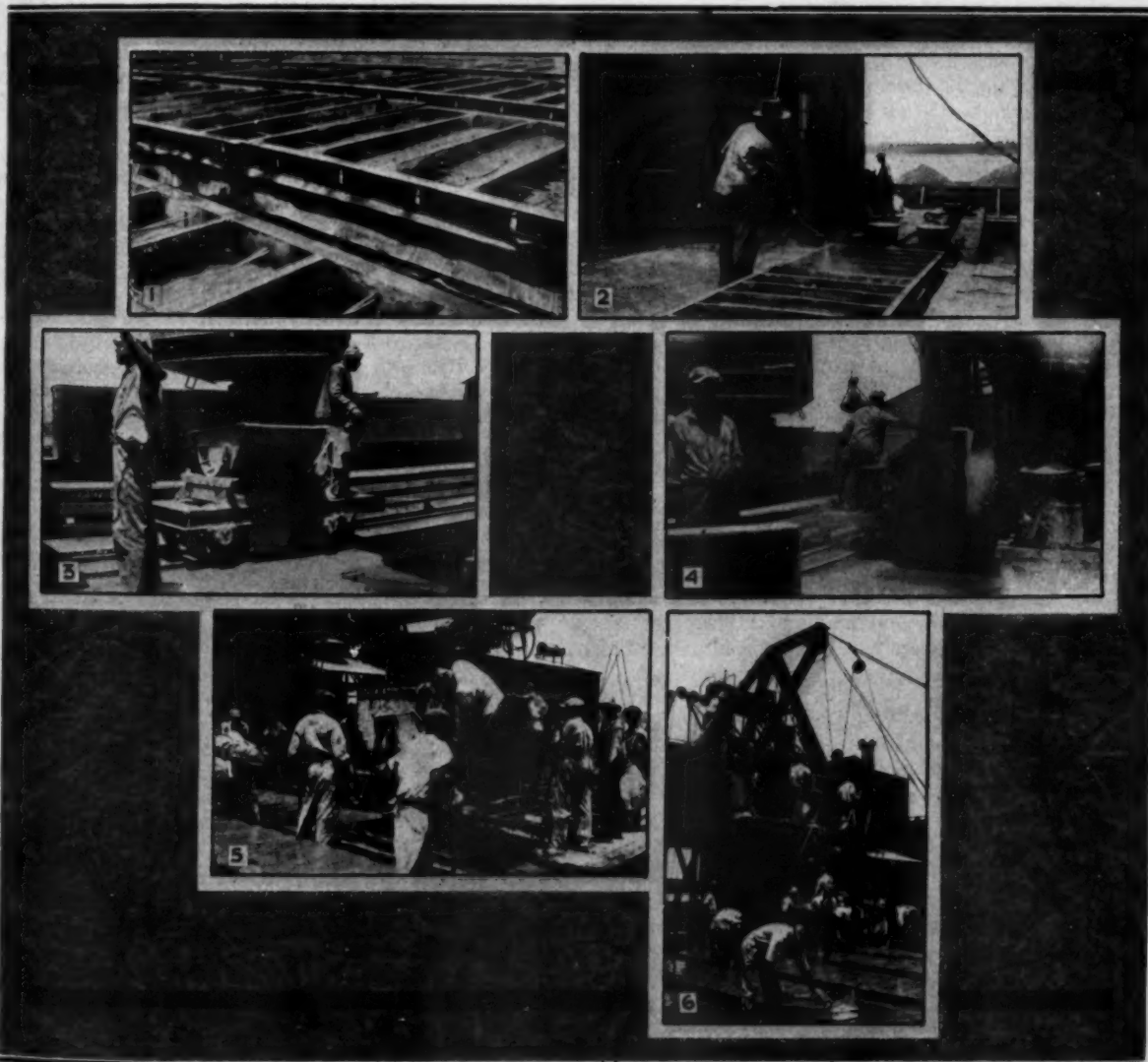
concreting unit is ready for that barge as there is little leeway on this plant. Every man has to work at just the right speed without lagging to keep ahead of the next operation.

The pouring is done by the Lakewood bottom dump bucket which rides on a boom extending out across the casting barge from the concreting barge. As the bucket goes out over the strip the concrete is permitted to run out at just the right rate to fill the forms. As soon as the bucket has cleared one strip the hand crew comes along and 3 men rake the concrete to even it off. Following them 14 men with shovels float the slabs to get a uniform surface and to see that the forms are completely filled. An electric tamper and floater was tried on this work but it was found that it brought too much water to the surface and made it difficult to work the forms. When the concrete was made with practically no slump the tamper worked to perfection but it was difficult to spread the concrete

with the bucket. Hence the tamper was discarded for hand work on this operation.

After the concreting has completed one entire trip across the fleet of 10 barges it returns to the beginning again and starts on the next tier of strips. The kraft paper is placed over the strip already cast and the forms again placed and the entire operation repeated.

The crew used on the barges consists of the following in addition to those already mentioned: 12 men go along after the concrete has been spread in the forms and floated and clean the aisles between the forms of any concrete that has been spilled and shovel it overboard. Two men lock the clips on the reinforcing steel to hold it in place. The work on the wooden forms which have recently been entirely replaced with the steel forms consisted of placing small stones or pebbles under the steel to hold it up, an operation which is done almost automatically by the steel forms. One man is used to distribute and another to place the clips



#### OPERATION OF THE PLANT FOR CASTING CONCRETE REVETMENT MATS AT GREENVILLE, MISS.

1. The steel forms assembled with the reinforcing. Below are also shown forms that have already been filled and having the heavy manila paper between the forms to separate the concrete. 2. Oiling the forms with a spray outfit. 3. The cement car from the Butler weighing batcher running to the mixer skips. 4. Dumping the cement car at the skips. 5. Pouring the mats with the Lakewood bottom-dump bucket. 6. Finishing the mat with a shovel, this operation is called hand floating.

used to hold the reinforcing at the edges of the wooden forms. Two men spread the paper rolls on the strips already cast and then the form setters put the forms on them immediately. Two men follow up and straighten the forms true to line. Two other men go over the barges continually after the strips have been concreted to clear the concrete from the timber heads and hatches so that they will not be fouled with the hardened concrete. Four men pull the forms as soon as the concrete has its initial set so that the forms may be used over again. Six men are used cutting reinforcement to size from the large rolls, and 6 other men distribute it to the spar boats by means of small flat bottom skiffs. A crew of 26 men spreads the paper, the reinforcing fabric and straightens the forms.

When the casting barges are being unloaded to the mat barges for placing in the river 2 men are used to go along the barge ahead of the unloading beam and loosen the concrete that usually holds the bottom strip to the deck. The unloading beam is an interesting device made with hooks or fingers along the side which engage with the reinforcing at the sides of the strips on alternate slabs and picks the strip up as an almost rigid piece.

#### LAND EQUIPMENT

An Industrial-Brownhoist steam locomotive crane runs on the spur track serving the plant and is used to unload the rolls or reinforcing to the barges, cement, paper and other supplies as needed.

#### POWER PLANT

The power plant on the concreting barge supplies all the electric current needed for the entire fleet of barges except the spar barges which are lighted by current from the local utility. Light is an important factor in this work as the plant is operated for two 8-hour shifts when the revetment work is under way with two or more parties working in the field.

A Winton 6-cylinder 225-horsepower diesel engine runs a General Electric generator which furnishes power to all auxiliaries and the main operating motors as well. At 225 horsepower the engine consumes 13 gallons of fuel oil per hour. An engineer and 1 helper per shift handle the power plant which is as well kept as any land plant or the engine room of an ocean liner.

#### PERSONNEL

This concreting plant was designed and built by the Third District now known as the Vicksburg Engineer District, U. S. A., Major John C. H. Lee in charge. The plant is located at Greenville, Miss., in charge of Eric C. Dye, General Foreman. Lieutenant Morris W. Gilland is in charge of the Central Area, Vicksburg Engineer District, in which the casting plant is located.

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*Among the features appearing in the October issue of CONTRACTORS AND ENGINEERS MONTHLY will be a description of contrasting methods on a sewer construction project in St. Louis, an article on unusual material handling and construction methods employed on a building in Montreal, a common sense article on depreciation of equipment and a number of road job articles.*

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### Factors in the Life of Wire Rope

**S**AFETY, life and strength of wire rope are governed by five factors. These are external wear, internal wear, fatigue due to bending and over-stressing, lack of lubrication and kinking. Each of these factors is controllable by improved operating methods and selection of better types and construction of ropes.

Any effort to reduce the external wear on rope is lost if, first of all, the sheaves are not inspected for alignment, size and condition. Sheaves with oversize bores, broken flanges, or worn threads, greatly accelerate wear on wire rope and encourage the jumping of sheaves. Accurate sheave alignment, smooth sheave treads, correct groove sizes and proper lubrication will do much to reduce external wear of wire rope, lengthen the rope's life and service and reduce accident hazards.

Few general recommendations can be made on the matter of sheaves as much depends on the existing individual conditions. Whether a hard or soft sheave is employed or whether it is more economical to replace the sheave than the line is determined only by individual cases. According to the Bureau of Mines, however, a rope should be replaced when the diameter of the outside wires has been reduced by wear to 65 per cent of its original sectional area, or when as many as six broken wires appear in any one lay of 6 x 19 rope.

Wire rope life and service are affected very materially by internal wear. Being flexible, there is considerable internal motion in the rope itself as it changes direction under the load, as when passing over the sheaves. Where there is friction, there is a tendency to wear the rope from within, to break down the internal wires, which can be corrected only by lubrication.

Where the rope is subjected to reverse bends, as in the case of a load line passing from a hoist engine under a sheave at the bottom of a mast and over a sheave a short distance from the mast, this stretching increases the internal motion and consequently the internal wear. It follows that the smaller the sheave the greater the stretch on the outside wires.

Internal wear can be materially reduced by proper lubrication and the use of larger sheaves. The latter is determined somewhat by the design of the equipment but larger sheaves will pay their added cost in increased rope life wherever conditions permit of their use.

The value of lubrication cannot be stressed too strongly and the additional cost of lubricating them is negligible when compared with the increased life resulting. Proper lubrication will minimize the breaking of interior wires which weaken the rope and which cannot be detected by casual inspection.

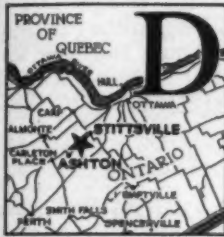
Perhaps one of the most important factors in the destruction of wire rope and in the creation of wire rope hazards is kinking. Elimination of this destructive tendency is possible by either the selection of the very best types of rope or by the employment of greater care in handling. In taking wire rope from a reel or drum it is best either to roll the reel along the ground or to mount the reel on an axis, then run the rope off as needed. Employing the same method when taking rope from a coil will permit the rope to lie flat, thus preventing kinks.

In sling and hoist service ordinary wire rope kinks badly. Still worse, just the moment the rope is worn a bit the broken wires stick out and jag the workmen's hands. This is a possible cause of serious injury and therefore every effort should be made to secure rope which kinks as little as possible, or better still, not at all.

It can not be too strongly emphasized, however, that wire rope which has once been snarled or badly kinked should never be replaced in service without close inspection and tests for strength. A kinked rope is always a dangerous rope.

# Building 10.5 Miles of Mixed Macadam in Ontario

*Grant Brothers Construction Company of Ottawa  
Opens Own Quarry at Plant and Designs  
Foolproof Machinery Layout*



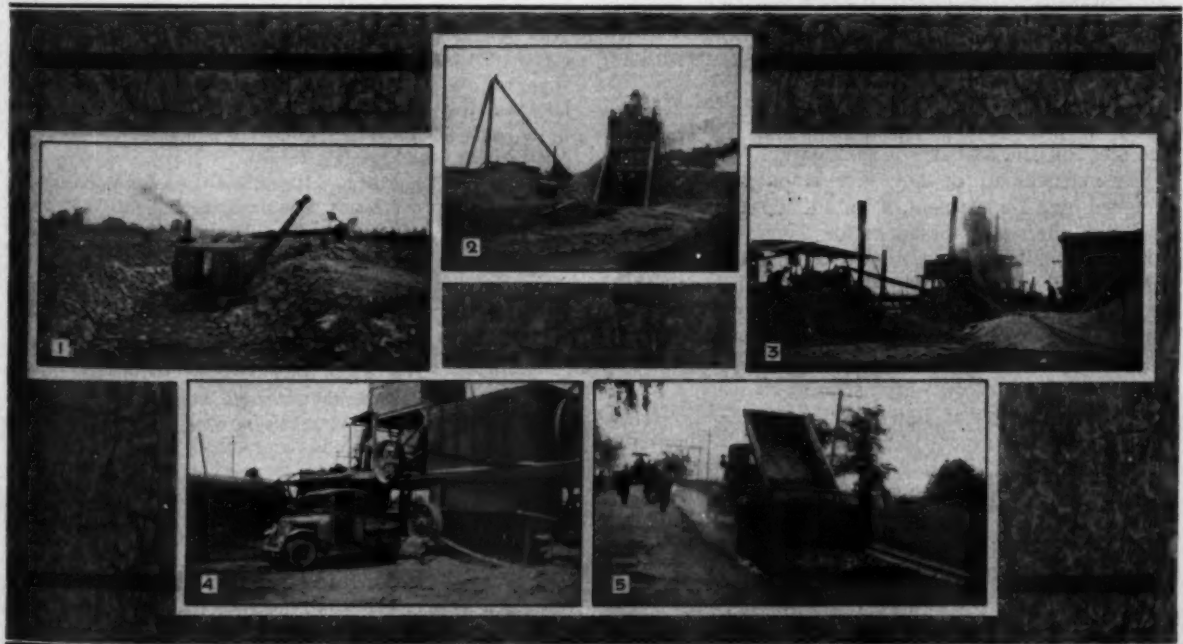
**D**URING the 1929 construction season which is not lengthy in Ontario, Canada, Grant Brothers Construction Co., built 10.5 miles of 20-foot asphaltic macadam between Stittsville and Ashton. The base for the new pavement was an old waterbound macadam pavement. A well-

thought-out plant layout made it possible for the contractor to use either a derrick and clamshell bucket for handling the stone from the crusher or, as the bin for the crushed stone was built high enough, it was possible for the trucks to run under the bin and haul the stone to the mixing plant. This forethought proved valuable when during the operation of the plant a cable on the derrick broke and released the boom, splintering it and making it necessary to replace it. During this time the mixer was supplied with stone by the trucks, thus avoiding any delays.

## THE QUARRY

About 5 feet of overburden was stripped from the quarry before actual operations could begin. This work was done by the Bucyrus-Erie Type B steam shovel which afterwards handled all the stone from the 18-foot cut loading the two White trucks which hauled the stone about 500 feet average to the crusher. An Ingersoll-Rand 220-foot portable compressor furnished the air for the Gardner-Denver and Ingersoll-Rand jackhammers.

A ramp to the pit above the crusher was built from the material removed in stripping the quarry. The trucks drove up and backed, so as to dump the stone into the No. 6 Kennedy gyratory crusher. The crushed stone was elevated by a Link-Belt 18-inch bucket elevator to a Niagara vibrating screen. The oversize ran by gravity to a No. 4 Kennedy gyratory crusher so arranged that the crushed stone from the second crusher went directly to the same bucket elevator that handled the stone from the first crusher. A 50-horsepower Case steam engine on skids supplied the power for the first



## QUARRYING OPERATIONS AND PREPARING THE HOT MIX

1. Bucyrus-Erie steam shovel in the quarry pit. The floor of the pit was carried about 20 feet below this level before the work was completed.
2. Truck delivering the rock from the quarry to the crusher. In foreground, the bin for screened material and at the left the derrick which was broken at the time this photograph was taken but which normally served the hot mix plant direct from the stockpile.
3. The 400-ton Cummmer asphalt plant operated by a steam traction engine.
4. Truck receiving its load of hot mix material at the asphalt plant.
5. A Graham truck delivering its load of asphaltic concrete to the subgrade, spreading it with a Burch spreader.



crusher and a 20-25-horsepower George White steam tractor ran the second crusher.

The stone that passed the vibrating screen was either stored in the bin below or let run to the side and handled by the derrick from the stockpile thus formed to the bin at the mixing plant elevator. The provision for storage in the bin and the ample space under the bin for trucks were helpful as described in the opening paragraph.

A crew of 22 men were used in the quarry and crushing plant working under Dennis H. Norman, Superintendent of the quarry. A blacksmith shop with a coal forge using air from the compressor for the blast and an Ingersoll-Rand pneumatic drill sharpener took care of the drill steel. This layout was the same as was used the previous season on a job to the north where the stone was much harder and consequently dulled the drill steel much faster. As the present stone is softer the layout is more than is really needed.

#### ASPHALTIC CONCRETE MIXING PLANT

An F. D. Cummer asphalt plant with a capacity of 400 tons a day was installed complete and worked through the season with a minimum of lost time. The drier was operated with both steam and fuel oil for removing the moisture from the stone and fines. The standard batch for this job was 485 pounds of stone, 280 pounds of fine stone and 35 pounds of asphalt. The temperature of the batches was maintained at between 285 and 300 degrees Fahrenheit.

Imperial Oil Co., asphalt was received by tank car at Stittsville and there heated and pumped to a tank truck owned by the contractor and hauled to the plant a distance of 6 miles. The plant was located at about the mid point of the project. Paving started at the Ashton end of the job and proceeded to the plant and then started at the Stittsville end and continued toward the plant and completion.

The plant was placed in operation the last of May, the time from the first of May until then being used for the erection and starting of the quarry.

Each truckload of hot mix from the plant was weighed by a Department of Public Highways inspector as it left the site as payment for the work was by the ton of asphalt. An average of 7 batches of hot mix weighing about 5,600 pounds were loaded onto each truck. Seven trucks were used for this work all either Grahams or Gotfredsons.

#### LAYING THE HOT MIX

The pavement was laid directly on the old water-bound macadam except in one short stretch where a fill was necessary. This was prepared by spreading the fill in 6-inch layers and rolling with one of the three steam rollers maintained on the job. In bad spots which were fortunately few on this job 6-inch agricultural tile was laid in the subgrade to facilitate drainage.

Forms for the asphaltic concrete pavement were set ahead using 3 x 6-inch timber staked with iron pins. The trucks turned a reasonable distance ahead of the spot where the load was to be laid and then backed to one of the two Burch asphalt spreaders. The crew quickly attached the spreader and almost instantly the load was spread and the truck returning to the plant for its next load.

The 3-inch bottom course was then immediately rolled

by one of the rollers, the rolls being kept wet by water from a tank carried at the rear of the machine to prevent the hot mix sticking to the rolls. One Case, one Sawyer-Mossey and one Montcalm roller were used for rolling the fill and the two courses of hot mix. A tank truck was used to supply water to the rollers for their boilers and for wetting the rolls. A Barnes Hercules pump operated by a Fairbanks-Morse engine was maintained at the side of the road about  $\frac{1}{2}$  mile from the plant to fill the tank truck.

As soon as a short stretch of bottom course had been laid the spreaders were hauled back and the laying of the top course proceeded in the same manner and of the same thickness. The crew working on the road consisted of 4 men shoveling and 3 raking. This crew and the seven trucks average 500 feet of finished pavement a day. Traffic was maintained over the road at all times during the job.

#### PERSONNEL

This work was under contract by Grant Bros. Construction Co., of Ottawa, from the Ontario Department of Public Highways. John Sears is District Engineer for the Department and William Waller, Chief Inspector. Charles Delaney was Superintendent for the contractor.

### Large Road Construction Programs Being Prepared in Many States Throughout the Country

**B**OND issues are of growing importance in highway financing as is indicated by a recent survey of sentiment in various states. Texas heads the list of states which propose to vote on bond issues this year with a projected issue of \$225,000,000. Oklahoma hopes to secure from \$100,000,000 to \$150,000,000 for its state road program. Georgia is pushing a \$75,000,000 issue and Iowa again will attempt to secure \$100,000,000. Iowa passed such a bond issue last year, but the bonding act was declared unconstitutional, although the ruling made plain that there was no objection to the road bonding theory.

In the 1928 elections, Missouri secured by popular vote \$75,000,000 in road bonds, Louisiana secured \$30,000,000 and West Virginia \$35,000,000. The 1929 Legislatures gave Maine \$15,000,000 in road bonds, New Hampshire \$8,000,000, and South Carolina \$65,000,000. The latter state expects to complete her state highway system within three to four years, building some 2,000,000 miles of hard-surfaced roads and otherwise improving 1,500 miles.

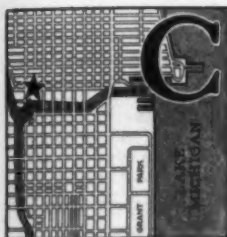
Thirty-one states which have resorted to bonding to put through the state highway program are much further advanced in their highway construction than the 17 states which are operating on the pay-as-you-go plan.

At the beginning of 1929, there were 77,792 miles of unimproved roads in state systems which total 300,929 miles. Twenty-four per cent of the total mileage or 54,045 miles are high type hard-surfaced roads and 169,092 miles are improved to some extent or surface treated. Thus, there remains much to be done on state roads alone. There is a general demand for attention to the secondary systems and farm-to-market roads. Both state and local road agencies are clamoring for funds from gas tax and motor vehicle registration. The Congress of the United States has been asked to appropriate \$225,000,000 yearly for Federal Aid roads instead of the \$75,000,000 annually which it now spends.

Highway bonding by counties has been adopted by every state but North Dakota. In many states these funds are spent under the direction of the state highway commission.

# Belt Conveyors Handle Aggregates and Concrete

*Fifty-five Conveyors Used on Merchandise Mart, Chicago,  
Speedily Carry Dry Aggregate to Bins  
and Concrete to Forms*



CONSTRUCTION of the Merchandise Mart, the \$32,000,000 structure being built in Chicago, has been interesting from the very start, and has shown remarkable ingenuity, particularly as regards material handling on the part of Bruce Gordon, General Superintendent for John Griffiths

& Sons, the general contractors. A battery of 55 Barber-Greene conveyors, 44 of which have actually handled the wet concrete, the remaining 11 being reserved for sand and stone, have made a most flexible system for material handling on this project.

## HANDLING AGGREGATE

The aggregate for the concrete has been delivered in hopper bottom railway cars on tracks located directly beneath the building itself, and the unloading section of the track was excavated below that so that the material flowed by gravity to the hoppers of the conveyors in the pits. Four of the conveyors were used in unloading stone and two on sand. These six belt conveyors stored the material in piles, taking care of the entire aggregate supply without working full time. The conveyors are 60 feet long by 24 inches wide, cleated belts, handling about 30 cars of material a day.

Underneath the storage piles are located the tunnel belt conveyors. These machines carry the material toward the central mixing plant, consisting of four towers, each supplied by a separate 1-yard mixer, making altogether two central mixing plants.

One belt conveyor under the sand and one under the stone bring the materials to the central mixing plant located on the river side of the building, where the aggregates are discharged into bucket elevators, one on each side of the plant. These elevators take the material up to the batching bins.

For the central mixing plant, located in the center of the building, two tunnel conveyors are located beneath the stock piles. These conveyors discharge into bucket elevators, which take the material up to the third floor, where it is discharged into permanent belt conveyors, which carry it to the center central mixing plant. The sand is carried over two permanent conveyors on the third floor and the stone is carried over one. These three conveyors are referred to as permanent installations, inasmuch as they are not mounted on trucks. They are really portable and can be lengthened or reduced in length as required very easily, due to their sectional construction.

## CONCRETE HANDLING

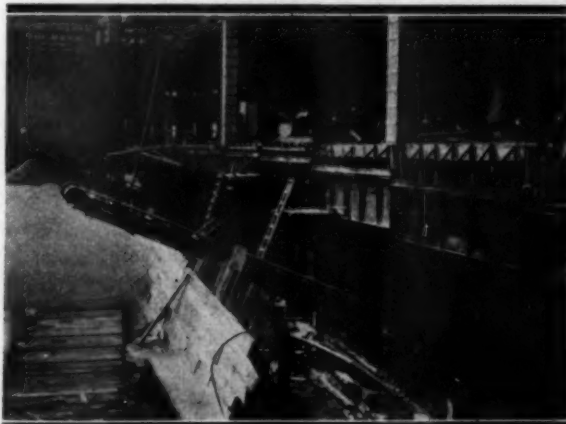
The mixed concrete is elevated from the four mixers

by the towers with 1-yard buckets. The material is raised by the towers to a point two stories above the floor being poured. The conveyors which are handling the wet concrete are located one floor above the floor being poured. Assuming that the third floor is to be poured, the buckets in the towers raise the wet concrete to the fifth floor, where it is discharged into a 1-yard hopper. This hopper has a chute in the bottom which carries the material down to the conveyor on the fourth floor. Altogether there are 44 conveyors for handling the mixed concrete. These conveyors are 40 feet long and 24 inches wide and are each mounted on rubber tired casters. In distributing concrete from the towers, 1 to 15 of these conveyors are used in tandem, as required to reach the point above the spot being poured. All the machines are electrically operated, and wires are conveniently strung with plug outlets throughout. The machines are easily moved about, forming various combinations, sometimes involving complicated turns. The fact that they are working on the floor above the floor being poured makes this an easy operation. Since the belts are run at a speed sufficient to handle a yard a minute, and 1-yard mixers are used, there is no delay due to the limited capacity of the conveyors.

## ADVANTAGES OF THE SYSTEM

There are a large number of advantages of this system of distributing concrete, both as regards economy in handling the concrete as well as in the resulting concrete that reaches the forms.

There are only four concrete elevating towers rising from two central mixing plants. This is the minimum of towers for such a big job. If conveyors were not employed, it would be necessary to use buggies, with probably 100 men wheeling them. This system would



*Unloading Stone from Pits Beneath the Railroad Tracks to the Stock Piles*





*Four Conveyors in Action Handling the Wet Concrete*

not only be much slower, but would be much more costly, and would involve about one hundred times the human element. The entire conveying system with buggies would be subject to the "not so fast" or "slow up a little" that tampers constantly hand to the buggy wheelers. With the present conveying system, the tampers are obliged to keep up with the flow of concrete coming down the trough from the conveyors. The mixer, tower elevator and conveyors operate systematically, efficiently, economically and do not lag or slow down as the hours of the day wear on.

With the belt system of carrying concrete, although segregation is not entirely eliminated, it is cut down to a negligible figure. Although the concrete is laid out flat on the belt and is carried along at a good speed, there is no friction between the material and the conveying medium. They are standing still in relation to each other.

On the Merchandise Mart job the conveyors used are 40-foot units. If only one machine is being used for carrying the material from the discharge chute of the elevator buckets to the discharge chute over the tampers, the material is carried so rapidly that settling does not have a chance to take place. If, however, a greater number of conveyors are being used to carry the material from the first discharge chute to the tampers, say, for instance, 10 to 15 units, covering approximately 400 lineal feet, every 40 feet there is a slight drop, not a sliding over a chute, but a drop from the discharge end of one conveyor into the hopper end of the next, this being identical to the mixing process in the mixer and actually mixes the material better, more than compensating for any possible settling taking place on each unit.

### 3,000,000 Yards of Rock for the Salt Springs Dam

**T**HE Salt Springs rock fill dam now under construction in the upper reaches of the north fork of the Mokelumne River, 45 miles east of the town of Jackson, Calif., will be 330 feet high, have a crest length of 1,200 feet and be 1,000 feet thick from the upstream to the downstream toes. This type of structure was selected because of the excessive cost of transporting cement and the width of the dam site and because there is an abundance of excellent granite.

In order to protect the structure against seepage, a trench 4 feet wide and from 12 to 15 feet deep will be excavated below bed rock along the entire upstream face of the dam. This cutoff trench will be filled with concrete to bed rock surface, above which level a concrete facing heavily reinforced and laid against a 15-foot thickness of placed rock will be carried to the top of the upstream face.

The first step in the construction of the dam proper was to strip the foundation of 310,000 cubic yards of gravel and boulders to bed rock. On this work the equipment used for the construction of the highway to the site was utilized, consisting of a Bucyrus-Erie 30-B steam shovel driven by compressed air, two Marion electric shovels, and a fleet of 5-ton trucks.

### Grading the Last Link of the Indianapolis-Evansville Road

**T**HE Foulkes Contracting Co., Terre Haute, Ind., is building 14 miles of concrete highway near Jasper, Ind., in two sections, 7.4 miles between Huntingberg and Jasper and 6.86 miles between Jasper and Hayesville. The first section had already been graded under a previous contract, but the grading of the second section is included in the work which Foulkes expects to complete before the end of 1929.

Western 7-yard crawler wagons with direct hitch were chosen for the grading operations, because of the steep grades on which they had to operate. A few miles north of Jasper a steep hill had to be cut down. The original plan was to have the shovel dig in at the lower end of the cut, and backcast the material until there was room for the wagons to work. Under this plan, as the digging progressed through the cut, the loaded wagons would keep going down the finished embankment on a 5 per cent grade.

As things actually worked out, the hill was too steep for the shovel to start at the bottom of the cut and it was necessary to dig in at the upper end of the cut. The excavated material then had to be hauled out up over the hill and down on the other side. Instead of working on a 5 per cent grade the Monarch tractors had to go down a 25 per cent grade with the loaded crawler dump wagons. A ¾-yard Osgood steam shovel did the digging.

### Building a County Dam

**A** \$1,250,000 hydro-electric project is being built by Crisp County, Ga., to aid in the industrial development of the County. Wilson Brothers, Minneapolis, Minn., under a sub-contract from S. J. Groves & Sons Co., Inc., also of Minneapolis, the general contractors, undertook the excavation of some 40,000 cubic yards of pier foundations and the placing of 250,000 cubic yards of embankment.

For excavating the material a 1¼-yard Northwest shovel was installed, loading into four Western crawler dump wagons of 7 cubic yards capacity. Three Caterpillar Sixties hauled the wagons and a Caterpillar Thirty was used with a bulldozer. The average haul on this sub-contract was about 800 yards, and Wilson Brothers loaded an average of 180 wagons per day. The record day's work for this outfit was 221 loaded wagons in eleven hours.

Ernest Wilson, of Wilson Brothers, was in active charge of this contract. W. H. MacArthur was superintendent for the general contractors, S. J. Groves & Sons Co., Inc.



# Laying Concrete Base for Rock Asphalt Top

*Hays Construction Co., Jackson, Tenn.,  
Speeds Work on 15.7 Miles  
Of 7-5-7 Base*



NE set up of the unloading and batching plant was not sufficient to take care of the 15.7 mile concrete base job of the Hays Construction Co., between Martin, Tenn., and Milan. The plant was first set up at Greenfield and  $3\frac{1}{2}$  miles of base laid north, then from the same location 3 miles of base laid from the south into Greenfield. The plant was then moved to Sharon north of Greenfield and the remainder of the northern section poured.

## LAYOUT OF UNLOADING PLANT AT GREENFIELD

With a 25-car spur track available there was not much trouble in taking care of the 7 cars of sand and 8 cars of gravel used each day. Cement was run in on a separate siding near a warehouse, part of which was used by the contractor for his office. The sand and gravel were unloaded from the gondola cars by two cranes. A Little Giant crane with a Blaw-Knox bucket handled the sand to the Blaw-Knox weighing batchers and a Koehring crane with the same make of clamshell handled the gravel. The cars were moved along the spur and spotted by the cranes. The trucks drove up to the cement car and had the required amount of cement dumped into a cement compartment in the rear of the truck and then proceeded to the batcher, backing under the bins for the load. A fleet of 10 to 20 Ford and Chevrolet 1-batch trucks were used for hauling the batches to the paver. The crew at the batching plant included: 1 foreman, 2 crane men, 1 man in the car to clean up, 1 batcher operator, and 1 man on top of the bins to remove pieces of wood that were in the sand or gravel, all of which is dredged material from the river. The crew at the cement platform included: 1 man weighing the bags as there had been some trouble with short weights in the bags as checked by the state inspectors, 2 men stacking the bags at the door of the car, and 1 man cutting the bags open and emptying them into the cement compartment in the truck. The empty bags were tossed off into a pile beyond where the trucks drove up and two men were used to gather them and bale them for return to the plant.

## A DESIGNED BATCH

The Tennessee Department of Highways uses a designed batch on all of its highway work. Each carload of sand and gravel is tested for moisture content and the batch changed about every two hours to give the best results. The 6-bag batch which was used, for ex-

ample, at 9.00 A.M. on July 15, was 1,753 pounds of sand, 1,866 pounds of gravel, and 5.86 bags of cement, using a 0.85 water-cement ratio. When there is a curve to be laid or the work is on a grade the amount of water used is reduced to give a stiffer mix and thus prevent any chance of the slab slumping on the grade.

## PREPARING THE SUBGRADE

The surface of the old clay-gravel road was scarified with a Carr rooter plow hauled by a Caterpillar Thirty. After blading with an Austin Rip Snorter grader with an 8-foot blade the grade was rolled by a Kelly-Springfield steam roller.

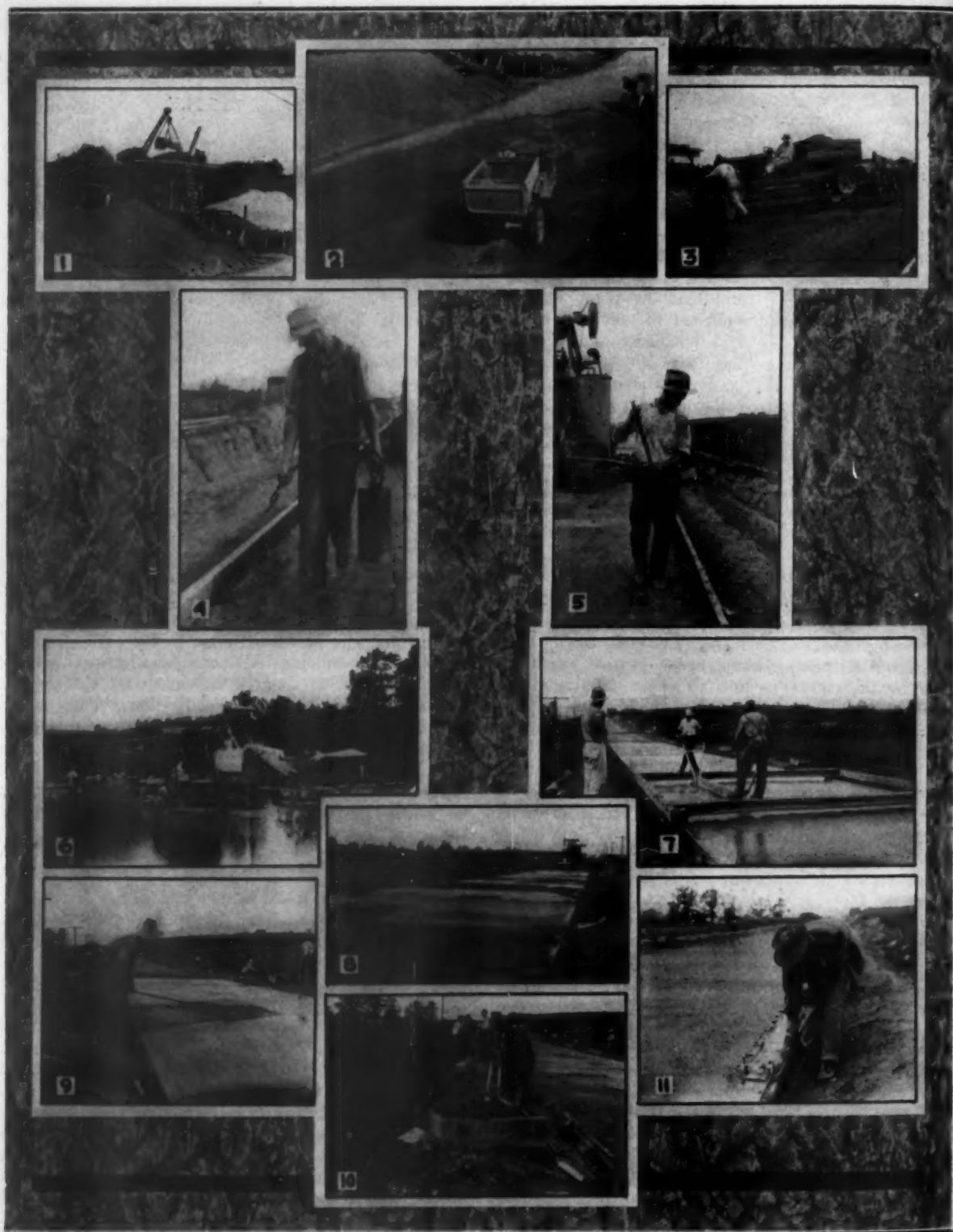
The final grade for the forms was cut by a Carr formgrader which piled the dirt at one side for removal by 3 slip scrapers hauled by 2-up mule teams. The spoil was hauled out over the forms and piled on the shoulders to be bladed close to the curb after the paving was completed. A Carr subgrader was used to plane the grade to close to the final parabolic section required by the Tennessee specifications. The section measured 18 feet wide and 7 inches thick at the edges and 5 inches thick at the center. A Fordson tractor with concrete-filled wheels was used to roll the final subgrade and also to move the Blaw-Knox turntable on which all trucks were turned about 250 feet from the paver.

## FORMS OILED IN A NOVEL MANNER

It is customary to see a man carrying a heavy pail of fuel oil along the forms as he laboriously brushes the oil onto the steel forms to prevent the concrete sticking. The Hays Construction Co., uses an insecticide sprayer of about 2 gallons capacity which is pumped up about every 50 feet to get up pressure and then the man is able to walk rapidly and spray the forms with a thin film of oil saving considerable time and a material amount of oil over the old method of slopping it on with a brush. We were informed that on another Tennessee job the contractor used the familiar knapsack type of insecticide sprayer which straps to the man's back and which has to be pumped continuously. This does not seem quite as convenient as the smaller one described above as it must be lifted to the man's back and securely strapped each time he is to use it, while the other device can be set aside and the man used for other work in the longer periods when he is not required for oiling forms.

## ALL FORMS TAMPED

After the Blaw-Knox forms were set by the form crew ahead they were carefully checked immediately



**OPERATIONS ON THE HAYS CONSTRUCTION CO. JOB THROUGH GREENFIELD, TENN.**

1. The batching plant alongside the 25-car spur track. 2. A batch truck pulling away from the cement car toward the batcher showing the small compartment at the back of the truck loaded with cement. 3. Turning the truck on the subgrade with a turntable. 4. A new use for the farmer's big gun. A 2-gallon insecticide tank spray outfit used to oil the forms. 5. Tamping the earth at the base of the forms. 6. The paver during a moment's lull in the pouring. 7. Using the longitudinal float from the double bridge. 8. The bridge that saves sighs. A great convenience to all operators in getting from one side of the slab to the other. 9. Marking or roughening the finished slab with a wire brush with flexible bristles. 10. The trays for the concrete needed for the curb. Man shown cleaning the curb forms before using again. 11. Finishing the top of the curb.

ahead of the paver and realigned when necessary. The form setting crew consisted of a foreman and 5 laborers with 4 men behind on the final alignment and tamping the base with a special tamper which looks very much like the bar used for moving freight cars by hand except that it has a wider end. In with the form crew were 3 laborers who shoveled behind the Carr subgrader. One man was kept ahead of the paver and between the form crew and the planer attached to the paver, sprinkling the grade during the hot dry weather.

#### PAVING CREW

One man was used to dump the trucks, 2 men on the hose and shoveling from the planer attached to the Rex 27-E paver, there was one paver operator, 3 men shoveling concrete, 1 man operating the Ord finisher, 2 men on the 10-foot longitudinal float worked from a double bridge on wheels and equipped with brackets on the sides to carry the float. This float, which is not used to any appreciable extent in the East, is admirable for removing high spots in the slab which would be noticeable to the automobiles running over it. It also removes any excess moisture from the surface before it has a chance to gather and run across the slab and carry cement away in streaks.

With the  $1\frac{1}{4}$ -minute mix required the contractor laid an average of 1,500 feet of concrete base per day.

Between the paver and the finishers and behind the mechanical finisher the contractor maintains a portable bridge 2 feet wide for the convenience of the men in crossing from one side of the slab to the other. This saves the time necessary to go up to the paver or back to the beginning of the day's run. In 5 minutes it was noted that the bridge was used 22 times by foreman, superintendent and laborers as well as the finishers.

#### FINISHING OPERATIONS

Immediately after the Ord finisher had made its second trip over the slab 2 men with long handled wire brushes dragged the brushes across the fresh concrete marking it to give a rough surface for the bonding of the rock asphalt top. The wires on the brushes were about 6 inches long and quite flexible.

#### LAYING THE CURB

After the brush marking the curb forms were set and filled from trays set every 50 feet along the shoulders on both sides. These were filled by the 3 men shoveling at the paver as they were reached. The trays were moved to points ahead of the paver as soon as they were emptied. There was one form setter on each side and 1 man on each side kept busy cleaning the forms as they were brought up from the rear, 2 hand finishers on each side using a steel trowel, edger and then a plank float. The curbs were  $1\frac{1}{4}$  inches high and 6 inches wide.

One man with a wagon and team was kept busy bringing up the road forms and another the curb forms. The road forms were kept set about 900 feet ahead of the paver at all times.

#### CURING

As soon as the curbs were finished the whole pavement was covered with burlap which was sprinkled by

one man for the remainder of the day. The burlap was spotted on the road ahead of the paver by the man bringing up the road forms. On the day following pouring the burlap was removed and the concrete sprinkled for 7 days and then held free from traffic for 21 days and until the rock asphalt top was placed as it was necessary to keep the clay and other dirt off the base so that there would be perfect adhesion of the base and top.

#### PERSONNEL

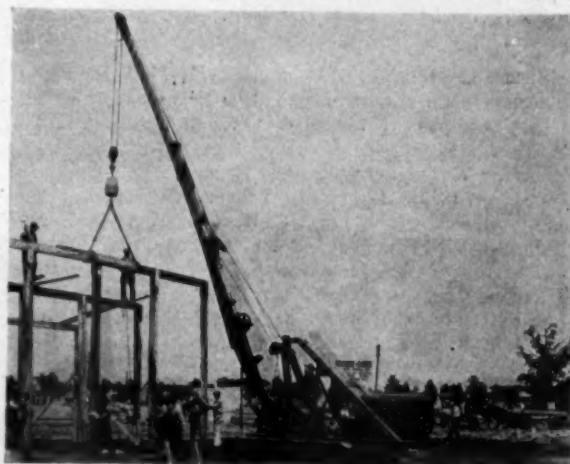
Joe I. Hays is President of the Hays Construction Co., Jackson, Tenn., and Clifford Walker acted as Superintendent on this work, with E. B. Platt as Superintendent of concrete work. W. B. Haynes was Resident Engineer for the State Department of Highways and Public Works, with headquarters at Milan, Tenn.

#### Safe Practice Pamphlet on Compressed Air Machinery and Equipment

**S**AFE Practice Pamphlet No. 47, entitled "Compressed Air Machinery and Equipment," has recently been published by the National Safety Council, 108 East Ohio Street, Chicago. It is one of a series of compilations of experiences and recommendations in accident prevention, and is published by the National Safety Council to promote safety in construction.

It is pointed out in the pamphlet that safety has been aided by the substitution of compressed air or other mechanical power for hand labor. But the use of compressed air also introduces new hazards that can be eliminated only by proper care in installing, maintaining and operating the compressed air equipment. A number of recommendations are made in regard to the installation and use of air compressors and air receivers, ways are suggested to avoid the explosion hazards and to utilize compressed air.

Special emphasis is placed on the point of safety, and the recommendations and suggestions include many warnings as to the proper use of such equipment. Copies of the pamphlets in this series may be secured from the National Safety Council.



A Standard Bay City Tractor Shovel owned by Rocque & Gibbs, Detroit, working on the erection of the framework of the new boxing arena at the Michigan State Fairgrounds, Detroit. When completed the arena will have a seating capacity of 35,000 persons. Instead of being equipped with a crane boom, the machine is equipped with a standard shovel boom from which the shovel bucket and dipper stick have been removed. To the shovel boom which is 15 feet long has been spliced a wooden extension with hook and block giving the composite boom a total length of 35 feet.



# Who's Who in Construction

*A Series of Reports from Active Contractors Published Monthly*

## BUS. VOL.—ANNUAL VOLUME OF CONTRACTS

- A—Over \$5,000,000
- B—Between \$1,000,000 and \$5,000,000
- C—Between \$500,000 and \$1,000,000
- D—Between \$250,000 and \$500,000
- E—Under \$250,000

**Scott Brothers Construction Co., Inc., Rochester, N. Y.**, 31 Exchange Street. Branch office: 233 West Dominick Street, Rome, N. Y. Organized: November 15, 1923. Bus. vol. C. Scott Brothers Construction Co., Inc., was incorporated November 15, 1923, by the members of the partnership of Scott Brothers. Officers: Robert G. Scott, President; James P. Scott, Vice President; Lewis G. Litchfield, Secretary; William E. Scott, Treasurer. Major contracts: 1927-1928, approaches, anchorages, abutments and decks, Mid-Hudson Bridge over the Hudson River at Poughkeepsie, N. Y.; 1928, abutments and piers, Central Vermont Bridge, Burlington, Vt.; 1929, state highway bridges at Chateaugay, Whitehall and Russell, N. Y., decks and approaches on Lake Champlain Bridge, Crown Point, N. Y.; recently awarded contract for Smith Street Bridge, Rochester, May, \$823,700. Member: A. G. C. of A.

**Baum & King, Inc., Paris, Ill.**, First National Bank Bldg. Bus. vol. D. Officers: F. C. Williams, President; Ralph A. Baum and Bert L. King, Vice President. Type of contracting: paving and grading.

**J. Olson & Son, Jacksonville, Fla.**, 135 East Bay Street. Organized: Jan. 1, 1922. Bus. vol. E. Officers: B. D. Olson, Julius Olson, partners. Type of contracting: marine, bulkhead, dredging, dock construction and boat building.

**Spalding Construction Co., Inc., New York**, 125 East 46th Street. Organized: May, 1923. Bus. vol. D. Officers: W. T. Spalding, President; J. C. Thornton, Vice President; J. R. Spalding, Secretary and Treasurer. Type of contracting: general.

**Siems, Helmers & Schaffner, Inc., St. Paul, Minn.**, 1014 Guardian Bldg. Branch offices: San Francisco, Calif. Subsidiary companies: Siems & Carlson, Spokane, Wash.; Northwest Florida Co., Panama City, Fla.; Alabama Engineering & Construction Co., Mobile, Ala. Organized: January 1, 1923. Bus. vol. B. Officers: A. G. Siems, Chairman of Board of Directors; C. H. Siems, President; N. F. Helmers, Vice-President; Rome A. Schaffner, Secretary and Treasurer. Major contracts: 1926, steam power plant, American Light & Tractor Co.; 1927, two large bridges, Florida, \$2,000,000; 1929, bridge substructure, Southern Pacific Railway, \$2,000,000. Members: St. Paul Association of Commerce; A. G. C. of A.



N. F. Helmers



Claude H. Siems



R. A. Schaffner

## Contract Waterproofing Co., St.

**Louis, Mo.**, 1853 Railway Exchange Building. Branch offices: Atlanta, Ga.; Baltimore, Md.; Birmingham, Ala.; Boston, Mass.; Buffalo, N. Y.; Charlotte, N. C.; Chicago, Ill.; Cleveland, Ohio; Columbia, S. C.; Dallas, Texas; Detroit, Mich.; Indianapolis, Ind.; Kansas City, Mo.; Los Angeles, Calif.; Minneapolis, Minn.; Nashville, Tenn.; Little Rock, Ark.; New Orleans, La.; New York City, N. Y.; Philadelphia, Pa.; Pittsburgh, Pa.; Portland, Oregon; Shreveport, La.; Toronto, Canada; Tulsa, Okla., and Washington, D. C. Organized: 1919. Bus. vol. D. Officers: H. C. Morrison, President; R. C. Meek, Vice President; H. E. Bensiek, Treasurer. Major contracts; Southwestern Bell Telephone Company Building, Shell Building, and Missouri-Pacific Building, all in St. Louis, Mo.



H. C. Morrison

**J. E. Schreadley, Harrisburg, Pa.**, 1712 N. 5th Street. Bus. vol. E. Officers: J. E. Schreadley, owner. Type of contracting: general construction, including conduits, roads and concrete work.

**Carl S. Risley, Mount Dora, Fla.**, 742 N. Tremain Street. Organized: 1916. Bus. vol. E. Officers: Carl S. Risley, owner. Type of contracting: sidewalks, curbs, foundations and cement block construction.

**Pugh Brothers, Baltimore, Md.**, 1333 Washington Blvd. Organized: May 6, 1926. Bus. vol. E. This company was organized in April, 1922, as Frank H. Cooper & Co., a partnership of Frank H. Cooper, Paul, Harley and Horace Pugh, to go into the steel erection business. In May, 1926, Mr. Cooper withdrew from the partnership, leaving the business in the hands of the Pugh brothers who operate it under their own name. Officers: Paul Pugh, Harley Pugh, Horace Pugh, partners. Major contracts: steel erection only on, 1926-1927, Reading Grain Elevator, Philadelphia; 1927, Municipal Office Building, Baltimore; 1928, North Avenue Market, Baltimore, Department of Agriculture Building, Washington; 1928-1929, Plant for Crown Cork & Seal Co., Baltimore; 1929, McComas Street Pier and Warehouse, Baltimore, Glenn L. Martin Aircraft factory, Middle River, Md.; in addition to 32 smaller jobs.

**L. Lombardi & Bros., Germantown, Philadelphia, Pa.**, N. E. Cor. Wister and Wakefield Sts. Organized: August 19, 1919. Bus. vol. E. Officers: Louis Lombardi, owner; Reuben C. Sklar, office manager. Type of contracting: general; also paving and cement.

**Hays Construction Co., Jackson, Tenn.**, Box 198. Organized: April, 1922. This company was organized as a partnership in April, 1922, and operated as such until last April when the business was incorporated under the laws of Tennessee, the name of the company remaining the same. Officers: Joe I. Hays, President; Mrs. L. P. Hays, Vice President; E. S. Benjamin, Secretary. Type of contracting: concrete paving, concrete bridges and dirt work, but mainly concrete paving contracts from the State Highway Department of Tennessee. Member: Tennessee Road Builders Assn.

## A Novel Railway Solves Problem of Stone Hauling

**A**T Escuminac, N. B., on the Gulf of St. Lawrence, a breakwater was needed to protect the fish producers and their boats from the gales that often develop from the east and inflict severe damage. Finally, the fishing interests brought sufficient pressure to bear on the Canadian Government to result in the erection of the breakwater at Escuminac.

Bids were called for and the contract given to McMulkin & Fox, contractors, of Gagetown, N. B. The breakwater plans called for a structure in the form of a capital L. Projecting from the shore to the east, the enclosed section was devised to provide absolute protection for the boats, and where they could ride at anchor with safety.

### SINKING OF CRIBS HAZARDOUS

Great difficulty was encountered in sinking the cribs in the deep water, and the first mishap came when one of the cribs, 220 feet long, was smashed in a bad storm. The contractors had paid \$150 per thousand feet for this lumber but it was like laths because of the ferocity of the wind and waves. At the time the storm sprang up only 750 tons of rock were in the crib. The wreckage was strewn along the shore for miles.

The section in which the breakwater is built is sandy, and stone is scarce. About three miles away from the breakwater

there are large deposits of rock. It was out of the question to haul the rock to the site of the breakwater because of the three miles of sand. The only way to get the rock to the breakwater was by water, in scows. The stone yard was located about 600 yards from the seashore.

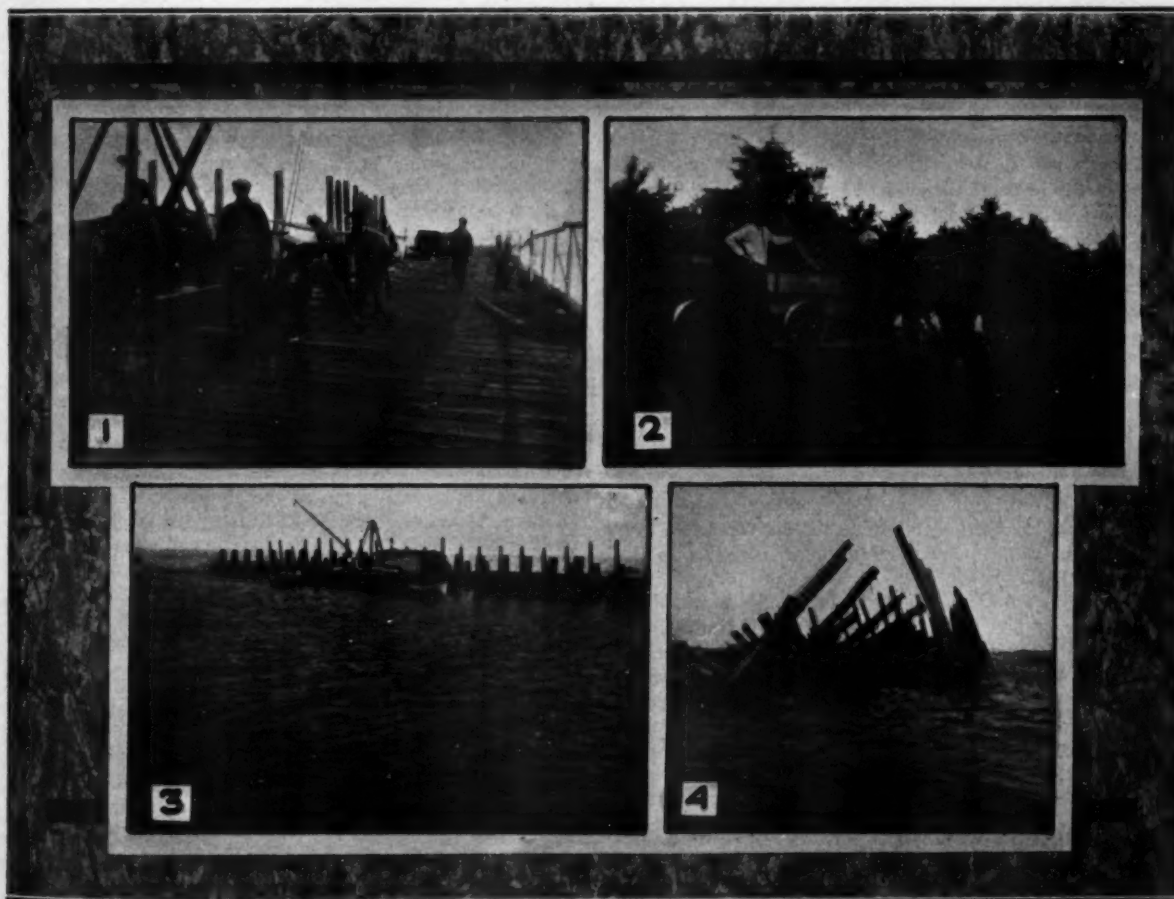
### NOVEL CONSTRUCTION OF RAILWAY

The contractors built a railway connecting the yard and the water, using every economy possible. Round logs about 6 inches in diameter were laid as rails, each log measuring 4 feet long and fastened to each other. The logs were cut nearby and sawed into the required length.

Cars were then built, the bodies of wood, and the iron runners double flanged to fit over the log rails. Two horses provided the motive power, with from 1 to 3 cars in a load. While the men were unloading one train at the shore, where a dock had been built, the remaining cars were being loaded at the yard. By sliding the load instead of rolling it all chance of the cars running away was eliminated.

Regardless of the tide, the scows were able to make the dock and load. In order to build the railway from the stone yard to the water's edge, the contractors had to cut through a sand dune which was 50 feet wide and 25 feet in height. The railway was without grades.

The cribs were built at Hardwicke, N. B., and towed to Escuminac. All the cribs were constructed of heavy, squared timbers. The hardest work was unloading the stone by crane and hand and filling the cribs. So hazardous was the shifting of the stone that there were many injuries.



### SCENES IN THE CONSTRUCTION OF THE ESCUMINAC, N. B., BREAKWATER

1. Handling timber for the cribbing. 2. The unique railway which handled 5,000 yards of stone for a distance of 3,000 feet to the wharf where the material was loaded onto scows and towed to the site of the breakwater. 3. One section of the cribbing in place and loaded with rock. 4. Part of the section of cribbing that was lost in a big storm.

# Legal Points for Contractors

*These brief abstracts of court decisions in the contracting field may aid you in avoiding legal difficulties. Local ordinances or state laws may alter the conditions in your community. If in doubt consult your own attorney*

Edited by A. L. H. Street, Attorney-at-Law

## Right of Contractor's Surety to Control Application of Payments Made by the Contractor to the Latter's Creditors

Payne had a city paving contract. He gave a surety company bond for payment of all claims for labor and materials. Subsequent bankruptcy rendered him immune from liability on a debt to a gravel company that furnished materials for the bonded job as well as other jobs. And, when suit was brought on the bond on behalf of the gravel company, the chief point of controversy concerned the right of that company to apply payments to certain items of indebtedness of the contractor, thereby making the surety company's liability greater than it would have been had other application been made.

The surety company litigated to the Supreme Court of Oregon its liability to the gravel company, but lost. The following conclusions were reached by the Supreme Court in this case which was decided February 13, 1929 (City of Marshfield vs. United States Fidelity & Guaranty Co., 274 Pac. 503):

"Appellant's legal position that a creditor cannot make a change in application of credits to the prejudice of a surety is sound. . . . But we cannot say as a matter of law that such was done. . . .

"When a surety, as in the case at bar, permits money on the contract to be paid the contractors unconditionally, which it must know he may use for general purposes, we see no sufficient reason for sustaining any claim of equity in behalf of the surety, in such money, after it has been paid to another in the due course of business. The risk of such a loss is one of the hazards which the surety, for a fixed consideration, assumes by its contract. While the rule last stated is not in keeping with the numerical weight of authority, we believe it is based upon logic and good reason and is recognized by the trend of recent decisions."

"The owner was entitled to the benefits of his contract and to have the buildings at no greater cost than the contract price. . . . The owner had the absolute right to complete the work in accordance with the contract and to charge the cost of the completion thereof to the appellant. He even had this right without any provision in the contract to that effect. . . .

"Under the circumstances existing under the record of this case, the owner had the right to complete the building and charge the reasonable expense and cost thereof to the appellant. The owner was not required to submit the cost of building the structure to competitive bidders, nor to complete the same at the lowest possible cost, but had the right to expend such sum for labor and materials as was fairly and reasonably necessary to complete the structure in accordance with the contract and the plans and specifications of the architect."

## Lien Law Held Without Extraterritorial Effort

A Georgia statute, giving laborers a general lien on the property of their employers to secure payment for labor performed, gives no lien arising out of a contract for labor, made and performed in another state. (Downs vs. Bedford, 146 S. E. 514, decided by Georgia Court of Appeals, January 22, 1929.)

## Effect of Changing Plan of Work in Completing Job on Original Contractor's Abandonment

Where a contractor inexcusably abandons a job before it is completed, there can be no doubting of the owner's right to relet the unfinished work and hold the contractor or his surety liable for any loss suffered by the owner over the price fixed in the original contract.

But that the owner's action in materially changing the character of the unfinished work may prevent him from enforcing any claim against the first contractor his surety is shown by what the Louisiana Supreme Court said in the case of State vs. Smith, 119 So. 56, disposed of November 26, 1928. That case involved a highway construction contract, but what the court said as follows would apply to any sort of agreement for construction:

"When a principal and his surety fail to complete a contract, their liability for such damages as may be suffered attaches the moment they are put in default. The reletting of the work under a condition, or subject to a term, differing from the former contract, in order to complete the undertaking, does not alter the prior contract, and does not, of itself, discharge the principal and surety thereof. . . . However, the changed condition or new term may have the effect of virtually discharging the principal and surety, by rendering proof of the amount of loss impossible. Where, however, the work to be done under the new contract is the same, and is to be done in the same location and manner, as under the former contract, it is possible to make such proof."

## Scope of Employers' Liability Acts

What the Louisiana Court of Appeal decided August 13, 1928, in the case of Hargis vs. McWilliams Co., 119 So. 33, is in line with the general tendency of judicial decisions throughout the country, in respect to the territorial extent of an employer's liability under a compensation act for injury to any employee while working in another state. The court held, in substance, that every employment contract made in Louisiana automatically makes the Employers' Liability Act (workmen's compensation law) a part of the employment, regardless of whether the work is done in the state or outside. Said the court:

"Nothing in this act restricts liability for work within the state. It suffices that the contract of employment be made in Louisiana to carry with it the liability of the employer fixed by that statute.

"It matters not where the work is to be performed; the question is where was the contract made. If the law of the place where the contract was made fixes liability, the liability follows the employer wherever the work is done. Any other view would leave the workman without remedy or relief contrary to the object and spirit of the law and against the principle that the compensation law must be interpreted liberally, in a sense favorable to the workman.

"The Employers' Liability Act of Louisiana forms part of every contract made in Louisiana for the employment of labor and carries with it the liability of the employer under said act for every injury suffered by the employee in the course of his employment in executing the work within or without the state."





## La Bour Pumps again make good in severe service

Working day and night, two LaBour Centrifugal Pumps were called into severe pumping duty during the construction of the new sewerage disposal plant at Oyster Bay, Long Island. The Arnolt-More Company, contractors, kept these pumps operating continuously on a forty point well system over a period of thirty days without shutdown except for an occasional change of oil when necessary. Faultless performance under trying conditions again brings gratifying testimony that LaBour Pumps *never lay down on the job.*

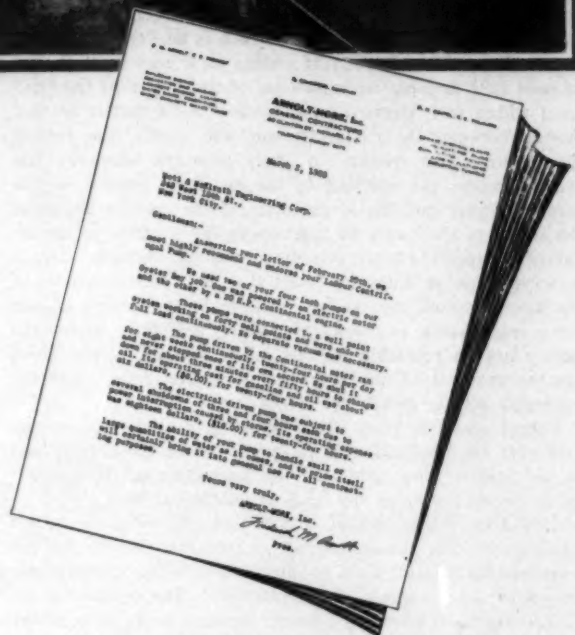
LaBour performance is the result of LaBour construction. Centrifugal, self-priming, LaBour Contractors Pumps use no floats and require no valves. The patented impeller is the only moving part, and wide clearances within the pump casing allow for the handling of dirty water without clogging. Offered in various sizes for stationary or portable installations, there is a LaBour Pump for every job where water difficulty is encountered.

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### **Surety's Right to Control Application of Payments Made by Contractor to Materialman Where Contractor Makes no Direction**

A recent (February 13, 1929) decision of the Oregon Supreme Court, handed down in the case of *City of Marshfield vs. United States Fidelity & Guaranty Co.*, 274 Pac. 503, shows that there is a regrettable lack of harmony in the appellate courts of the country on a phase of this subject. The court said:

"It is well established that any payments made by the contractor from funds not derived from the contract cannot be disturbed by the surety. In such case the creditor has the right of election as to whether the payment will be applied upon a secured or unsecured account. If it be assumed, however, that, in fact, the payments were the fruits of the contract, then a different question is presented—one upon which there is much conflict among the authorities. There is one line of authority, of which *Sturtevant Co. vs. Fidelity & Deposit Co. of Maryland*, 92 Wash. 52, 158 P. 740, L. R. A. 1917C, 630, is a leading case, in which it is held that a creditor may make such application of credits as it sees fit if it acts in good faith and has no knowledge of the source of the fund from which such payments are made. As a matter of fair dealing between the contractor and the surety, the former should direct the creditor to apply proceeds which he has received under the contract to the beneficial interest of the surety. Under this line of authority, if the creditor knows of the source of the funds, he must apply the payment to the indebtedness incurred in the performance of the contract. . . . A second line of authority holds that it is immaterial as to the knowledge of the creditor relative to the source of the fund from which payments are made, and that, where the surety has an equitable interest in the specific funds which are the proceeds of the contract, the creditor must apply the payments for the protection of the surety. . . .

"There are other cases which hold that a surety has no control over the application of payments where the money paid is not held in trust, and that the knowledge of the creditor as to the derivation of the funds is immaterial."

It will be understood, of course, that this whole discussion presupposes that the contractor, as principal debtor, has not exercised his primary right to direct the creditor to apply payments to specific items of indebtedness. The creditor is entitled to make application between different items of indebtedness only when the debtor has made the payment without any direction for its application.

### **Bank Held Not Protected by Contractor's Bond—Foreman Covered**

Where a highway contractor gave a bond under the statutes of North Carolina for the payment of labor and material supplied to him, a bank that lent him money with which to pay for labor and material was not protected by the bond, held the North Carolina Supreme Court in the case of *R. L. Nelson & Co. vs. R. C. Hill & Co.*, 146 S. E. 135. The court observed that this "judgment accords with the general holding that a bank furnishing money to a contractor doing public work, for use in paying the claims of laborers and materialmen, without more, does not come within the protection of a statutory bond conditioned to pay all persons supplying the principal with labor or materials in the prosecution of his work."

But the court intimates that where, in lending money for such purposes, the bank takes an assignment of the claims of laborers and materialmen paid out of the loan funds the bond will cover the loan.

For similar reasons, it was held that a foreman who advanced funds to the contractor's "petty cash account," which was used in paying for repairs on machinery, purchasing materials, and paying freight, was not entitled to the benefit of the bond. But it was held that the bond secured the payment of his wages.

### **Contractor's Obligation to Maintain Pavement for Four Years Interpreted**

A street paving contractor gave a statutory bond to keep the street in good repair for four years, and in the case of *Charles City vs. Rasmussen*, 224 N. W. 589, question was raised as to the extent of the obligation thereby incurred. The Iowa Supreme Court decided (April 2, 1929) that it was no defense to liability on the bond that the defects did not result from faulty material or workmanship. The court said:

"This statute contains no exception concerning ordinary wear or usual repairs. The requirement provided by the statute is a contract to keep the improvement in good repair. This is the obligation of the contract and of the maintenance bond. Upon defendants' theory, in order to fix the liability of the defendants, it would become necessary to determine how much of defective condition of the street . . . was due to the ordinary wear as applied to a paving constructed with good materials and workmanship, and how much was due to defective workmanship and material. Manifestly this would be practically impossible. . . .

"Manifestly the contractor does not agree, and he is not by statute expected, to give the city a new pavement at the end of the maintenance period, except in replacing defects. It is contemplated that, even though the materials used are of the best of the kind specified and the workmanship used is of the highest skill, nevertheless the improvement has had a natural deterioration or depreciation. No claims were made in this case for deterioration."

### **Contractor Judicially Defined**

In the case of *Home Oil Co. vs. Helton*, 14 S. W. 2nd, 549, decided by the Arkansas Supreme Court March 11, 1929, it was held that where an oil company agreed to erect an oil station according to certain plans and specifications, it became a "contractor," within the meaning of the local mechanics' lien law. The court said that one is a contractor, under such statute, "who, under contract with the owner, agrees for a consideration to furnish the material, labor, and superintendence necessary to the erection of the building or other improvement on the owner's premises," or "a person engaged in making a contract with the owner for the improvement of certain real estate."

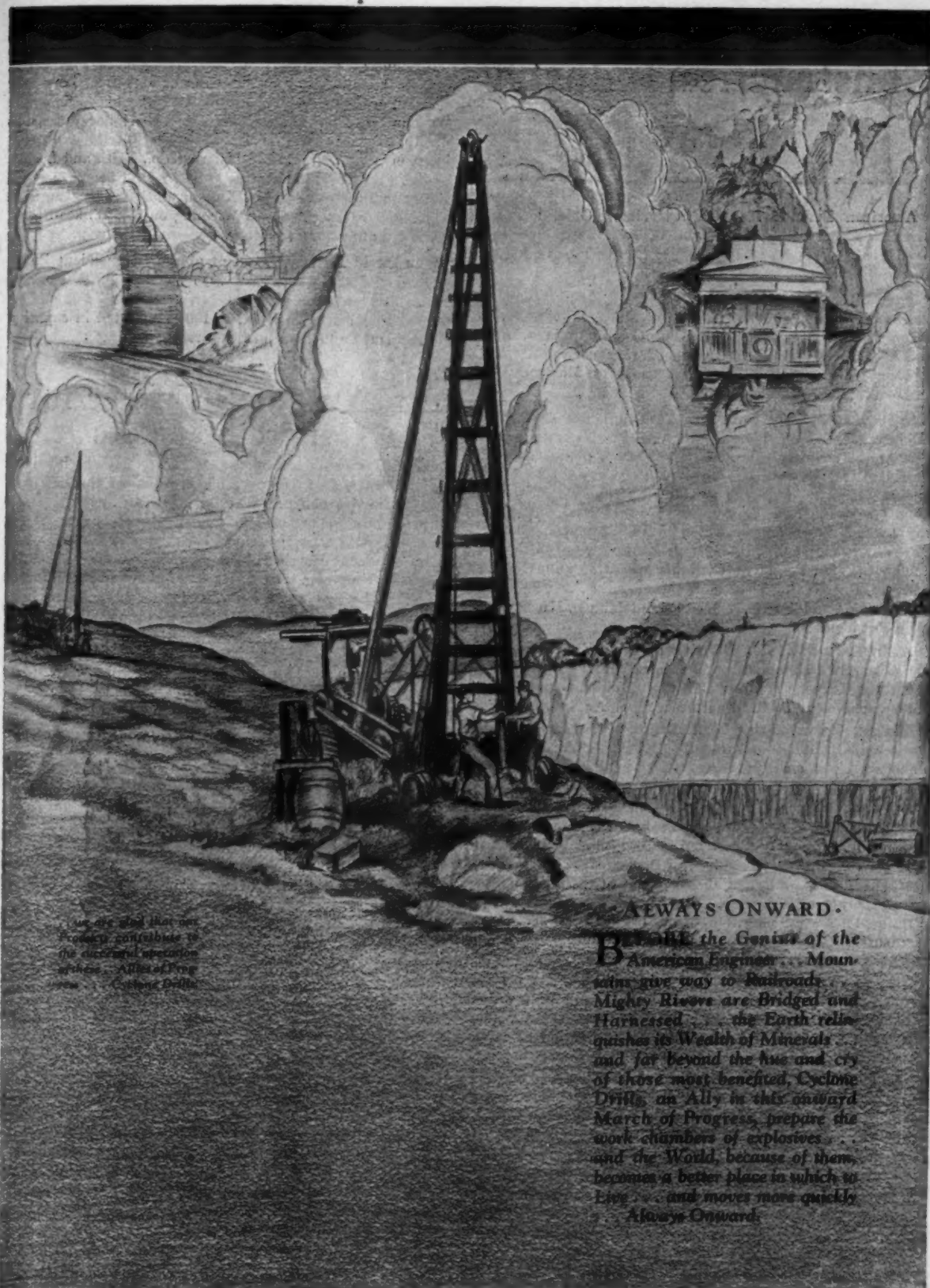
### **Contractor As an Expert Witness**

Ordinarily a witness at a trial in court is permitted to testify to facts only. But where a controversy involves some scientific question experts are properly called in to give their opinions, so that the trial judge or the jury may weigh these opinions in reaching a conclusion.

The foregoing explanation will render intelligible to the layman the meaning of the following language used by the Indiana Supreme Court in the case of *Smith vs. Hill*, 165 N. E. 911, decided March 29, 1929:

"Appellants' objection to the action of the court in permitting the contractor and the road engineer to answer questions calling for their opinions, as expert witnesses, as to whether the gravel was a good quality paving material and suitable for the road in question, is on the ground that the evidence sought to be elicited from the witnesses called for an ultimate fact or an opinion upon the point which it was the duty of the court to determine, and an opinion upon a subject of which the court was as well prepared to judge as the witnesses. The rule contended for is based on the assumption that the court and jury are as able to give an opinion from facts disclosed as the witness, and it is subject to the exception which permits skilled witnesses to state an opinion in connection with facts observed and stated. . . . Where there is evidence that a witness from experience or learning has special knowledge of material or appliances, the witness may express an opinion as to quality and utility."

The court decided that the expert opinions were properly admitted in this case.



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# Construction Industry News

**American Fork & Hoe Co.**, Cleveland, Ohio, has announced the appointment of M. D. Swift, 912 Western Ave., Seattle, Wash., as its District Representative in the Pacific Northwest.

**International Cement Corp.**, New York, has announced that George E. Pierson, formerly Manager and Sales Manager of the Lone Star Cement Co. of Indiana, Inc., has been elected Vice President of that company. Mr. Pierson will relinquish his duties as Sales Manager but will continue as Manager.

**Thomas E. Murray, Inc.**, New York, announced recently the election of John H. Lawrence, Vice President and Manager of the company since its organization, to the office of President. Mr. Lawrence is a graduate of Cornell University and previous to joining Thomas E. Murray, Inc., was employed with the New York Edison Co. In 1919, Mr. Murray formed the company which bears his name and Mr. Lawrence was put in active charge and has acted in the capacity of Vice President until his recent election to the office of President. Thomas E. Murray, Jr., is Chairman of the Board and Joseph B. Murray and John E. Murray are Vice Presidents.

**A. W. French & Co.**, Division of Blaw-Knox Co., Chicago, Ill., has announced the removal of the sales office from the Chicago Works and the establishment of the sales department at 122 South Michigan Avenue, Chicago.

**Eastern Paving Brick Manufacturers' Assn.**, formerly located in Real Estate Trust Bldg., Philadelphia, Pa., has announced its amalgamation with the National Paving Brick Manufacturers' Assn., and the removal of its office from Philadelphia to the Empire Bldg., Pittsburgh, Pa.

**E. B. Kelley Co., Inc.**, New York, has announced that the business formerly conducted at its Philadelphia branch has been incorporated under the name of **E. B. Kelley, Inc.**, and will be continued at 520 Arch Street, Philadelphia, as a separate organization. The officers are E. B. Kelley, President; A. M. Thornton, Secretary and L. W. Cline, Treasurer.

**The George D. Whitcomb Co.**, Rochelle, Ill., manufacturers of industrial and railway locomotives, has broken ground for the construction of a new factory unit which will be completed before the end of September. This extension will be used primarily for the erection of large oil electric locomotives from 20 to 100 tons.

**Chain Belt Co.**, Milwaukee, Wis., has announced the removal of its Houston, Texas, office from 1,000 Marine Bank Bldg., to larger quarters at 1310 Second National Bank Bldg. Russell G. Davis is Manager.

**Gardner-Denver Co.**, Denver, Colo., reports that two of its foreign branch managers left the United States recently to take charge of their respective offices. Ralph Scott, formerly sales manager of the drill division of the company, will be stationed in London permanently. W. G. Agnow, who was until recently the Gardner-Denver sales representative in Arizona, leaves for Lima, Peru, to take charge of the office there.

**The Link-Belt Co.**, 910 South Michigan Ave., Chicago, Ill., has announced the appointment of the following distributors for Link-Belt cranes, shovels and draglines: Charles L. Miller of Denver and Salt Lake City will handle Utah,

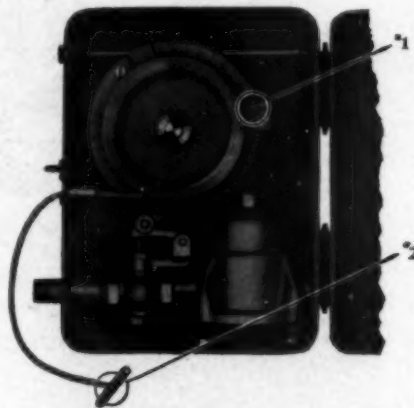
Colorado, and the intermountain territory; James Van Buskirk, 911 Martin Bldg., Birmingham, will handle sales in Alabama; The Clyde Co., 309 Magazine St., New Orleans, is handling the business throughout Louisiana and the southern half of Mississippi with the exception of a few counties in the southeast corner; The Holloran Tractor Co., 188 Butler Ave., is handling the territory around Memphis, Tenn.; the United Hoisting Co., 136th and Locust Streets, New York, is handling the Greater New York territory including Westchester, Nassau and Suffolk Counties; Ensminger & Co., 181 South Washington St., Wilkes-Barre, Pa., is handling that territory.

**John David Hurley**, President of the Independent Pneumatic Tool Co., Chicago, Ill., died suddenly on August 15, at his home in Chicago. Mr. Hurley organized the Independent Pneumatic Tool Co., in 1905 and acted in capacity of President from then until his recent death.

## An Automatic Meter for Concrete Mixers

WITH the increased use of concrete, there has been much research which has brought out that the ideal mix is obtained when all aggregates are accurately and uniformly proportioned and measured. Measuring devices for sand and gravel and stone have been developed which accurately determine the weight or volume of the aggregate.

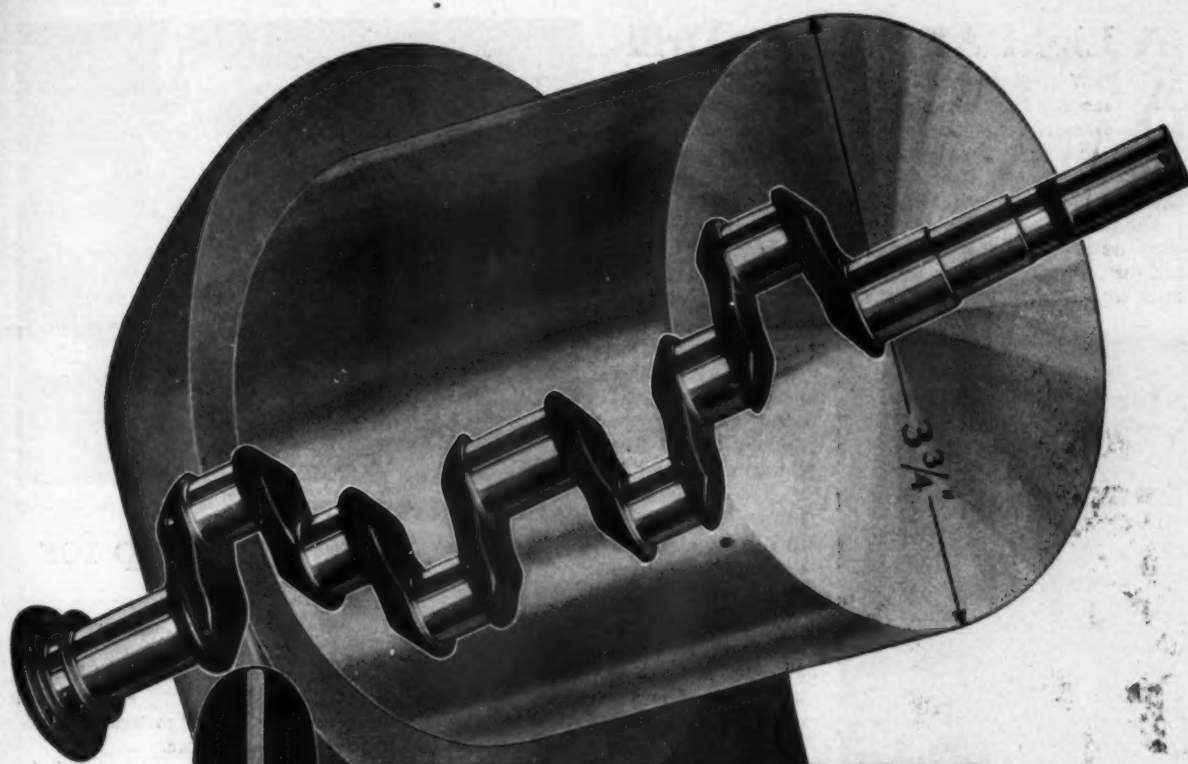
A new automatic meter for accurately and uniformly measuring the amount of water used in each batch has been developed by the Automatic Meter Sales Co., 3115 Plankinton Bldg., Milwaukee, Wis. This meter which is pictured below



*The New Automatic Meter Control on Concrete Mixers*

measures the amount of water, but is not affected by variations in pressure. The proper amount of water to be used is calculated or several trial mixes are made and then the dial, shown as 1 in the illustration, is set for the amount needed. The box should then be locked, eliminating the possibility of the mixer operator changing the amount.

Should a change in the amount of water be needed, it can be made in a very few seconds by simply moving the dial to the amount desired. When the mix is ready for the water, the operator simply pulls the cable, indicated as 2, starting the flow. The operator may then proceed with other work, for, when the required amount of water has passed through, the meter automatically stops the flow and does it accurately. To this meter is connected a register showing the number of batches made. This meter should prove a boon for use on mixers not equipped with automatic water measuring devices and batch counters.



## OVERSTRONG

### Free from harmful distortion

**T**HE crankshaft in a Waukesha engine is extra rigid. Overstrong...  $3\frac{3}{4}$  inches in diameter... it is so large that it is free from deflection. That's why its bearings are not subjected to the excessive wear that shortens the life and lowers the efficiency of engines that use smaller and lighter shafts.

The critical speed of Waukesha's crankshaft is well above its operating speed. And when this thick-cheeked, five-bearing crankshaft... with its big diameter journals and unusually long center bearing... is mounted in the Waukesha extra rigid "girder" type crankcase, unusually smooth performance and lack of critical vibration is an accomplished fact. Write for Bulletin No. 540. *Industrial Equipment Division, Waukesha Motor Company, Waukesha, Wisconsin. Offices: New York, Tulsa, Houston, San Francisco.*

969

# WAUKESHA ENGINES

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## A Light All-Purpose Drill

**A** NEW all-purpose rock drill, known as Model 11, has recently been developed by the Gardner-Denver Co., Denver, Colo. This is a light drill which can be used for wet or dry drilling. It weighs only 50 pounds and is claimed to have a drilling speed equal to that of heavier machines. It is rotated by a rifle bar and ratchet.

The drill has a tubular spool type valve that has only a short travel distance. The hammer is sturdy in construction and carefully machined. It has 8 flutes on the area that contacts with the chuck driver. The cylinder bushing which is interposed between the cylinder and the chuck is easily removed and replaced when worn by the hammer travel. The chuck end is made of a specially heat-treated drop forging that has an integral lug for holding the steel retainer.



*The Model 11 Gardner-Denver Light Rock Drill*

The chuck driver and chuck are made of alloy and steel with one diameter construction. Eight splines take the rotative strain. With a liner that is pressed in steel, replacements can be made easily. The 6-fluted bar of the drill is held in sliding contact by a bronze nut. The ratchet has 4 pawl plungers and 4 pawl springs which hold the pawls in contact with a ratchet ring which may be reversed to give double service. The back head is drop forged and has a throttle valve and handle boss that are integral. The throttle valve and air connection are held in place by a spring

when the air is shut off and by air pressure when the machine is in operation.

The handle grips are of tire stock rubber that are held by a heavy through bolt, which eliminates fatigue to the operator. The steel puller is of simple design and is operated by hand. The part which engages in the collar of the steel may be replaced when worn. The pivot is lubricated.

This new drill may be mounted for light drilling, channelling with a quarry bar, used on a tripod or for miscellaneous work where a light mounted drill is desired. It takes steel ranging from  $\frac{3}{4}$  to 1 inch. While in ordinary operation, this drill keeps the hole clean and free from cuttings by means of sending a strong air current through the drill steel. When drilling unusually deep holes, a special blowing device can be turned on. A single oil reservoir in the cylinder lubricates all moving parts or, if desired, Gardner-Denver air line oilers may be used. All parts of this drill are made by the best alloy steel and drop forgings to insure lengthy service.



*A Lakewood 28-S Mixer Equipped with the New Loading Skip*

## A New Loading Skip for Mixers

**A** NEW widened open-type loading skip, which can be adapted to 21 and 28-S mixers, has recently been developed by Lakewood Engineering Co., Cleveland, Ohio. The illustration shows a Lakewood 28-S equipped with this type of skip, which permits prebatched material to be delivered directly into the skip from the truck.

The open end of the skip illustrated is made 108 inches wide so that standard batch delivery trucks with pneumatic tires can be backed into it easily without cutting or tearing the tires. This machine is furnished on steel wheels so that it can be unloaded and loaded to the job very readily and moved about when occasion demands. It is a compact machine, requiring a clearance of 18 feet from the ground to the tip of the skip when the skip is raised.

All of the levers for the operation of the paver are banked for one-man control. The machine is equipped with a 40-horsepower Waukesha gasoline engine. It can be equipped with a batch meter for timing the mixes and the batch meter, in turn, can be equipped with discharge chute lock.

The drum and other parts of the machine outside the skip are that of the standard 28-S Lakewood building mixer, which is intended for building purposes using batched materials.



*A Cletrac Model 30 with a 6-yard Euclid crawler wagon removing dirt on a road project at Sandy Lake, for which H. W. Baldwin, Ohio, is contractor. The dirt had to be hauled over an average haul of 500 feet and the Cletrac made from 10 to 15 trips per hour*



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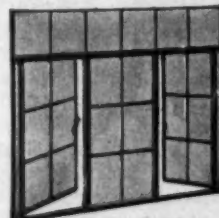
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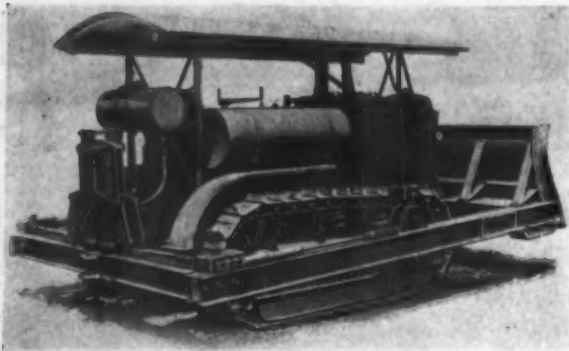
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*The New Baker Hydraulic Bulldozer Mounted on a Caterpillar Tractor*

## New Tractor-Mounted Hydraulic Bulldozers

**B**AKER hydraulic bulldozers for mounting on Caterpillar Thirty or Sixty tractors are manufactured by the Baker Manufacturing Co., 585 Stanford Avenue, Springfield, Ill. These bulldozers are particularly designed for such work as backfilling trenches, pushing material over embankments, leveling and spreading dirt on fills, leveling roads for trucks, or pushing material against a bridge or culvert. The bulldozer can easily be mounted on the tractor in the field or detached and the tractor used for other purposes when desired.

The frame of the bulldozer entirely surrounds the tractor, mounted and pivoted at the rear of the tractor draw bar and on the outer ends of the rear axle of the tractor. The pull is thus at three points in a straight line with an even distribution of power. The rear cross beam is solidly bolted to the side beams forming a solid unit. The side beams are likewise firmly bolted to the moldboard through stud beams, making the whole a complete solid assembly. The short stub beams permit ready detachment of the moldboard for transportation on a truck if necessary. Mounted forward of the center of the truck frame on each side is a heavy steel bracket clamped to the truck frame of the tractor by heavy bolts. The lower part of the bracket acts as a guide for the side frame. At the top of the bracket a roller chain is attached which operates over a cast steel sprocket wheel mounted in suitable bearings on the side frame. As the roller chain is connected to the hydraulic ram at the rear, the vertical action of the ram lifts the moldboard off the ground to the required height.

The moldboard is constructed of heavy steel plates reinforced at the bottom by a wide cutting edge of high carbon steel. The strain is taken by two deck plates extending the full width of the moldboard making an exceedingly stiff bracing. Short heavy bars extending from the moldboard to the deck plate brace the top of the moldboard. All parts are riveted in place to make a compact unit. The entire moldboard can readily be disconnected by removing the bolts in the splice plates which connect the side beams to the stub beams, which are riveted to the moldboard.

The manner of mounting the bulldozer permits carrying a considerable part of the weight forward of the center of the tractor. The moldboard when completely lowered floats on the ground. By lengthening or shortening the roller chain the blade can be made to operate various distances below the track.

The operating lever, located on the right hand side of the tractor driver, permits free operation of the tractor and bulldozer at the same time. The raising and lowering of the bulldozer can be accomplished at any time the engine of the tractor is running, whether going forward, backward or standing still. Power is derived from the tractor transmission, the gear

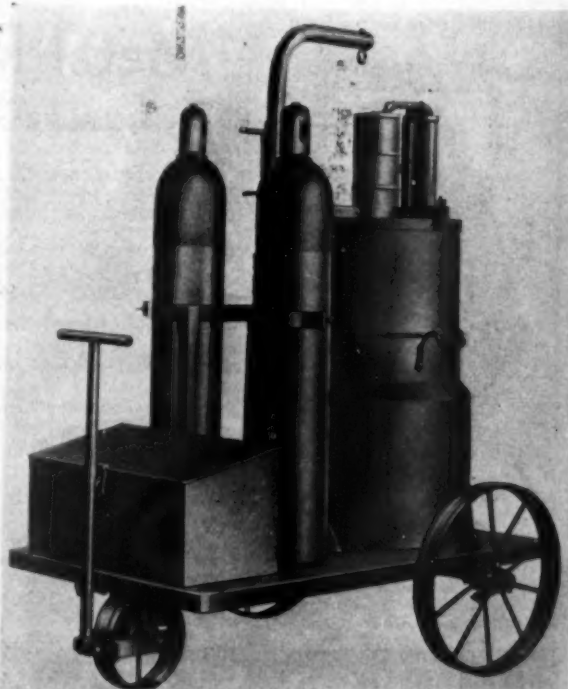
pump being directly connected to the power drive shaft. The pump operates the hydraulic cylinder ram which uses light engine oil supplied from the oil supply tank located above the pump.

## Two New Trucks for Acetylene Generators

**T**WO new types of trucks have recently been announced by the Oxweld Acetylene Co., Carbon and Carbide Bldg., New York, to accommodate Type CLP-3 and Type CLP-2 Carbic low-pressure acetylene generators. The truck designed to carry a CLP-3 Carbic generator also carries two cylinders of oxygen. It is sturdily constructed throughout and is oxy-acetylene welded. Two large wheels carry the back part of the truck. A third wheel, in the front, is of the caster type and allows the truck to be turned in a radius about equal to its own length. The generator is secured to the steel deck of the truck by means of angle iron braces and two long bolts which are inserted in the handles of the generator and tightened by means of turnbuckles.

The truck is provided with a steel tool box with loop fastenings. This box can be used for wrenches, small tools or for a welding or cutting outfit. The oxygen cylinders are chained to a steel rack which is fastened to the deck of the truck beside the generator. A sturdy crane is provided to be used in charging and emptying the generator. With this crane the gas bell can be lifted out of the generator and the water and the residue then drained off through the outlet at the bottom. The crane jib is made in three sections which can be telescoped when not in use to decrease the height. The truck has two 24-inch steel wheels with 3-inch tires and a caster wheel which is 12 inches in diameter by 2 inches. All wheels are provided with grease cups for lubrication.

The smaller truck will accommodate one cylinder of oxygen in addition to the CLP-2 generator. It is designed for extreme portability and can be wheeled anywhere with ease. There are two 24-inch wheels and one 5-inch caster wheel operating on a roller bearing.



*The New Truck for CLP-3 Carbic Generator Carrying in Addition 2 Cylinders of Oxygen*

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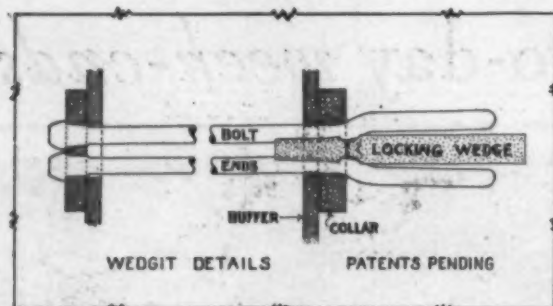
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# Tarvia

FOR ROAD CONSTRUCTION  
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*The Details of Wedgits and Their Application to Concrete Forms*

## A New Kind of Bolt for Tying Concrete Forms

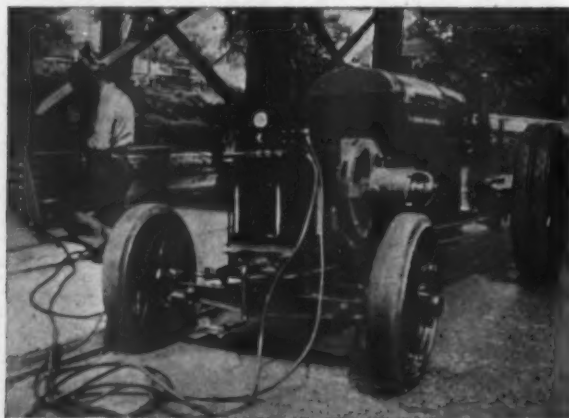
**A** NEW bolt for tying concrete forms which looks and drives like a spike, is manufactured by the Wedgit Tie Co., Inc., 95 Liberty Street, New York. These bolts, which are known as Wedgits, are designed for use in tying irregular shaped columns or walls of any size, and battered walls, for tying concrete to the back of stone ashlar, tying spandrel beams, belt courses, cornices, balcony risers, pipe trenches, lot line walls, underpinning and close openings.

The bolt consists of two iron rods with a common head, with a buffer, collar and locking wedge which is inserted between the rods, thus holding the form rigid with no chance for it to spread. The two rods which form the bolt will withstand a 2-ton pull. The Mule or tightening tool, weighing but 3 pounds has a 30 to 1 pull, assuring a tight form which is rigidly held when the wedging lock is driven. Wedgits are made in five lengths from 40 inches to 120 inches, for tying concrete up to 8 feet in thickness.

## A New Tractor-Mounted Stable Arc Welder

**A** NEW Lincoln stable arc welder mounted on a McCormick-Deering tractor has been announced by the Pontiac Tractor Co., Pontiac, Mich. This unit is furnished in either a 200 or 300-ampere machine and offers a wide range of utility.

The extension frame in this mounting is such that the tractor is simply set into a 4-inch I-beam frame and the front axle assembly is set ahead under the frame, thereby lengthen-



*The New Lincoln Stable Arc Welder Mounted on a McCormick-Deering Tractor*

ing the wheel base. This construction reinforces the tractor and makes it easy to steer with the added weight.

The welder unit complete with the panel is mounted on this frame member ahead of the tractor and takes its drive from the power pulley at the side of the tractor by a belt. This makes a compact self-contained unit capable of moving about under its own power. The 48 x 4 dual tires used in the rear give this unit a road speed of 15 miles per hour.

## A New Boom for Use with Tractors

**A** BOOM which can be used wherever loads are to be carried or a portable unit required is manufactured by the W-K-M Co., Inc., Houston, Texas, and is easily attached to tractors. The swinging feature of the boom itself permits unloading or moving materials from one place to another without moving the tractor, and with the boom at normal length.

As a backfilling unit, the cable on the slow speed winch is used as the drag-in line and attached to the drag-in chain on the bucket. The high speed winch spools the cable for the throw-out line which is attached to the throw-out chain of the bucket. The boom is then attached to the upright by a chain. On backfill work, the boom can be extended to the desired length up to a maximum of 20 feet. Buckets up to a maximum size of  $\frac{3}{4}$ -yard can be secured. Without moving the tractor the boom can be swung so that the bucket can clean up the spoil pile for a distance of 10 feet beyond the length of the tractor.

Both the high and low speed winches are mounted on the left hand side of the tractor, and are driven off the main shaft through a chain drive to the power take-off of the tractor. Two auxiliary or swing winches are also provided on the left side for swinging the boom. These winches are powered through the main drive arrangement and do the swinging through a cable drive attached to the boom.

The boom itself is mounted on pinions attached to the heavy channel in the roller track assembly. A-frames are provided on each side of the tractor, connected by a cross brace, thereby eliminating all strain on the track roller frames and final drive bearings. Automotive type levers control all winches and brakes.

This equipment is applicable to standard models of Caterpillar Twenty, Thirty and Sixty tractors and is operated from the power take-off.



*The W-K-M Boom Operating with a Caterpillar Tractor*



# DURING

## the rainiest March in years

### *▲ this relief storm sewer had to go in*

**Q**UICK action was needed in a section of this important middle-western city during the rainiest March in years . . . streets and basements would flood . . . property would be damaged . . . land values would suffer . . . unless an adequate relief drainage system was provided *at once*.

Due to a continuous downpour, the excavation was a torrent during the period of installation—but the work went steadily on thanks to the long, lightweight sections of Armco Corrugated Iron Pipe that solved the prob-

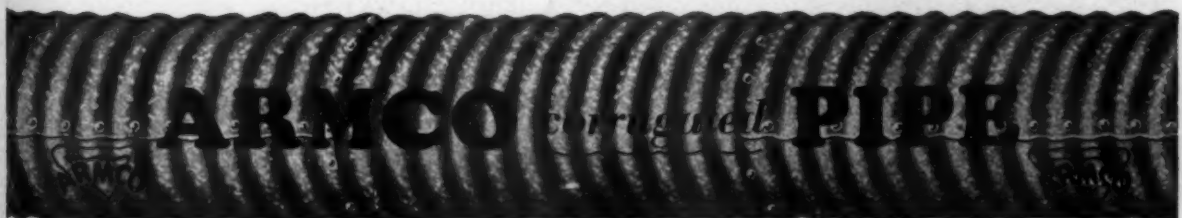
lem. The sections were quickly lowered into place and joined together, and the sewer was in service weeks before it could have been completed with any other material.

"Planning Municipal Drainage for Today and Tomorrow" contains valuable information on the use of Armco Corrugated Pipe for storm sewer and other drainage applications. A copy of the bulletin mailed on request. Send for it today.



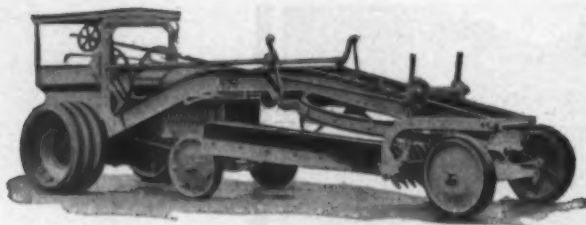
*Armco culverts and drains are manufactured from the Armco Ingot Iron of The American Rolling Mill Company and always bear its brand.*

ARMCO CULVERT MANUFACTURERS ASSOCIATION  
MIDDLETOWN, OHIO



©1929, A. C. M. A.

Do you mention the CONTRACTORS AND ENGINEERS MONTHLY when writing? Please do.



*The Trackson-McCormick-Deering Tractor Unit With Gilbert Grader*

## A Heavy Duty One-Man Patrol

**E**CONOMY is becoming an increasingly important factor in the selection of highway and construction equipment and today highway officials and contractors realize that real economy means the purchase of a machine which is adaptable to many kinds of work and that can be used throughout the year. The Model DH Trackson-McCormick-Deering tractor unit with a Gilbert grader made by the Gilbert Mfg. Co., Stillwater, Minn., is a new combination in the form of a heavy duty one-man patrol which provides a crawler tractor quickly available for other kinds of work. The speed and simplicity of either mounting or detaching the grader are important advantages of this unit. There are no special parts necessary for its installation and it is said to be about a 4-minute job to remove the grader from the tractor, leaving a complete crawler-equipped power plant which is adaptable to a large variety of jobs.

With the unit assembled, the grader is ready for road work, snow removal and general grading operations.

## A New and Improved Wood Worker

**A** NEW and improved wood worker which is designed for ripping, cross-cutting, dadoing, mitering, beveling and twenty-nine other operations with the use of various attachments, has been announced by the DeWalt Products Corp., Leola, Pa. This Model-D Wonder-Worker is powered by a two or three phase 5-horsepower motor, the design of which results in a motor with greater power on full load and less temperature rise.

This machine rips 4-inch fir at the rate of 50 lineal feet per minute, cross-cuts 6-inch material and can be switched from cross-cutting to ripping without turning off the power. The cutting tool is guarded in all positions.

The dial plate with degree markings and pitch scale is placed out in front of the operator for easy adjustment for angle and bevel cutting. The plate is notched at each 45 degrees for the quick finding of such angles. The motor is locked instantly and securely in any cutting position by means



*The New and Improved DeWalt Wood Worker*

of a positive locking device and convenient hand lever, so that all changes in adjustment are made instantly and surely.

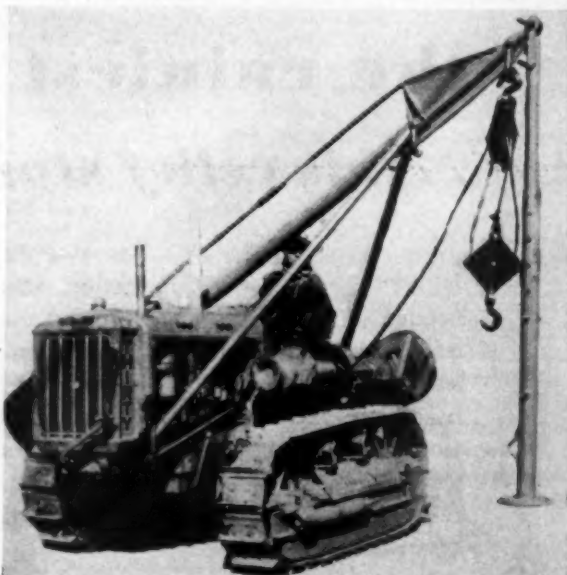
This Model D is readily portable, weighing 340 pounds and is fitted on a table, 29 x 59, which can easily be handled by two men.

## Side Winch and Boom for Tractors

**P**ARTICULARLY designed for moving and loading pipe on pipe-line construction, machinery or rehandling similar loads is the new side winch and boom recently developed by the Allsteel Products Manufacturing Co., Inc., Wichita, Kansas, for use with a Caterpillar Thirty Hillside special. This equipment is easily mounted, it being necessary to drill but four holes in the drawbar plates of the tractor.

The approximate weight of the side winch is 1,200 pounds.

It has four speeds forward and one reverse. The capacity pull in low is 12,450 pounds; in second, 6,200 pounds; in high 3,000 pounds and in reverse, 12,150 pounds. The drum capacity is 250 feet of 1/2-inch line. The winch clutch is



*The New Side Winch and Boom for Use with Caterpillar Tractors*

the positive pin type with automatically lubricated shifter form.

The boom and winch when equipped weighs approximately 5,700 pounds, including counterweights and the boom is 15 feet long. It will raise and carry 4,000 pounds with the counterweights and without the stiff leg. Its lifting capacity with a stiff leg used at the outer end of the boom is 40,000 pounds.

## Integral Steel Door Jambs and Trim

**A** NNOUNCEMENT has recently been made of the new Truscon integral door jambs and trim made by the Truscon Steel Co., Youngstown, Ohio. This article combines door frame, bucks, lintels, jamb, casing, door stop, transom bar and transom casing in one piece which is easily and quickly erected as an integral part of the wall.

The door jamb and trim is fabricated from standardized steel parts for both single and double doors of standard dimensions. Each frame is anchored to the wall and rough floor. It is delivered complete with holes drilled and tapped for attaching hardware.

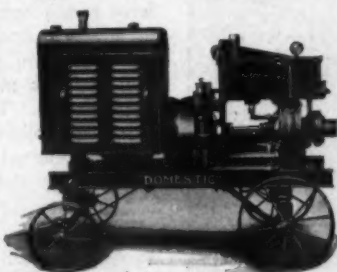


## "DOMESTIC" AUTOMATIC PRIMING CENTRIFUGAL PUMPS

This Pump absolutely primes itself; and will draw water 27 feet vertical.

Is ideal for use on all types of dewatering jobs including Drainage Point Pre-drainage, as shown in cut.

The positive high vacuum this Pump is able to create has, in many cases enabled contractors to drain DRY, deep excavations where other suction type pumps have failed.



Automatic Control of vacuum producing action keeps the Pump primed whenever there is enough water to seal and fill the suction line. This is a valuable feature, as it not only gives large pumping possibilities but **KEEPS** the excavation DRY by taking care of seepage inflow.



Literature  
upon  
request

Manufactured by

**DOMESTIC ENGINE & PUMP CO., Shippensburg, Penna.**

## ATLAS Portable Belt CONVEYORS

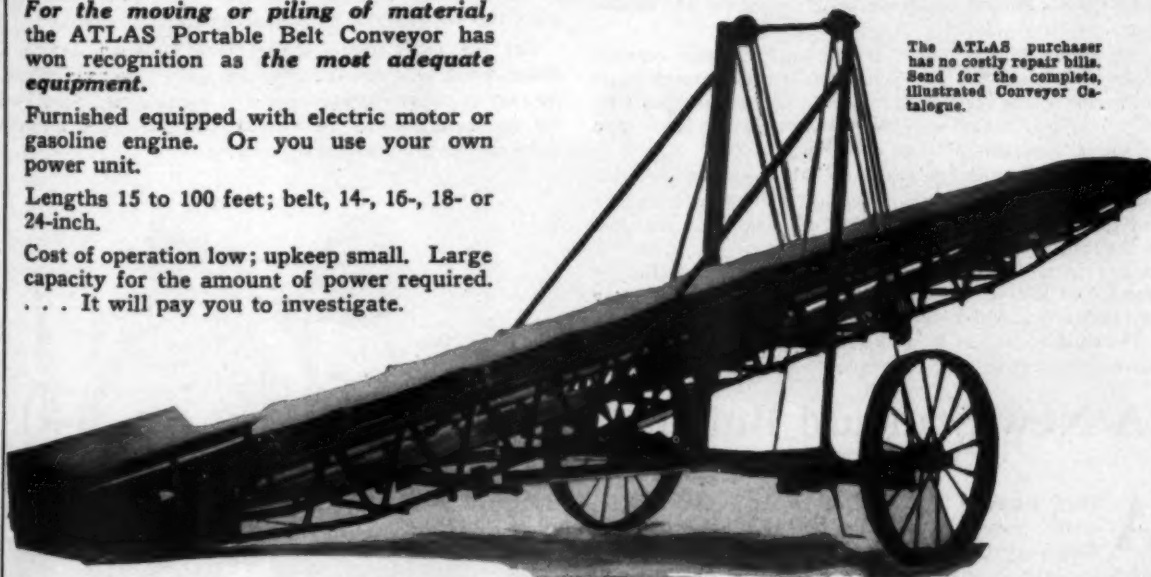
For the moving or piling of material, the ATLAS Portable Belt Conveyor has won recognition as *the most adequate equipment.*

Furnished equipped with electric motor or gasoline engine. Or you use your own power unit.

Lengths 15 to 100 feet; belt, 14-, 16-, 18- or 24-inch.

Cost of operation low; upkeep small. Large capacity for the amount of power required. . . . It will pay you to investigate.

The ATLAS purchaser has no costly repair bills. Send for the complete, illustrated Conveyor Catalogue.



**ATLAS ENGINEERING COMPANY**

Box "N"

Manufacturers of Bucket Elevators—Loaders—Tractors, Etc.

Branch Office

**Clintonville, Wisconsin**

**Milwaukee, Wisconsin**



*The Byers 3/4-Yard Shovel*

## A 3/4-Yard Full Revolving Shovel

**A** NEW 3/4-yard Byers shovel-crane-dragline has recently been announced by the Byers Machine Co., Ravenna, Ohio. This machine is similar in design to all other Byers models.

The Byers direct drive conserves engine power by eliminating extra gears and shafts which might create friction. The power take-off is by silent chain to jackshaft and then direct to the hoist, crowd and swing, distributing the power load over two small pinions on the jackshaft.

Power is supplied by a 75-horsepower 6-cylinder motor with 4 3/8-inch x 4 3/4-inch stroke and bore. A scavenger oil pump delivers oil to all bearings regardless of the working angle of the machine.

The machinery deck is a single unit casting which holds motor, drums, swing and travel gears in alignment. Deck gears, shafts and side frame castings are large and heavy of alloy steels. Moving parts are easily accessible for adjustments.

The Byers 3/4-yard shovel travels on long, wide crawlers which provide stability for traveling over soft or rough roads and permit lifting the maximum rated crane loads with a wide safety factor of stability. Broad self-cleaning treads are held by special steel pins of large diameter.

This machine is equipped with the Byers independent cable crowd which makes possible spotting the dipper accurately and quickly without waste motion. The dipper starts close to the trucks and holds accurately to the stake line on shallow grading jobs. When digging in a bank the dipper can be crowded in and out of the material while hoisting to make any thickness of cut desired or to work around obstructions.

The machine is fully revolving and may be used as a crane, shovel, trencher, skimmer or dragline.

## A New Standard Building Mixer

**A** NEW Ransome 7-S standard building mixer has recently been announced by the Ransome Concrete Machinery Co., Dunellen, N. J. This new mixer, in which has been incorporated a number of new and improved features, is light in weight and is easily moved about on the job. The main frame is designed to let the mixer turn in a circle having a radius of 13 1/2 feet, thus allowing the contractor to get the mixer close to the job, even in limited space.

The drum of this mixer which is of all steel construction is 45 inches in diameter and 34 3/4 inches long. It handles a two-batch 1:1 1/2:3 mix or a one-bag batch of 1:3:6 mix.

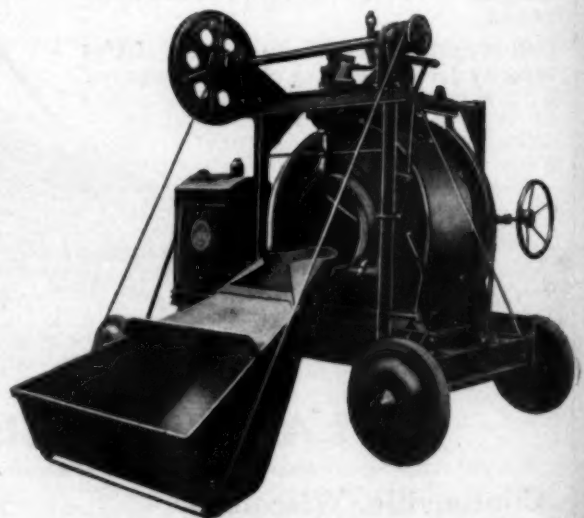
The radius of the corners is 2 1/2 inches. The mixing action is obtained by 8 pick-up and 4 mixing blades. The drum is easy to keep clean because of liberal water clearances and large radius corners. It has all steel tires and the gear is of nichrome semi-steel. The drum is bored accurately to fit the drum shell, and is located in the center of the load so that there is no lateral travel to put undue wear on the roller flanges. The large V-shaped drip rings are replaceable. The drum rollers are genuine car wheel metal, equipped with Timken bearings. The drum roller shafts are specially heat-treated alloy steel.

The main frame has two long members made of 6-inch channels which carry the drum roller axes. The frame carries the gear reduction unit and the supporting frame is made of 5-inch channels mounted on the long channel. All frame work is strongly gusseted and hot riveted. The driving mechanism is identical with the bevel gear drive used in most automobiles. The usual gears and counter shaft construction are replaced by a fully enclosed gear unit running in oil. The gears are heat-treated alloy cut steel on specially heat-treated alloy steel shafts running in Timken bearings. One end of the cross shaft carries the drum drive pinion, equipped with an outside band. The other end is protected by an enclosed plate on low charging mixers, or extends out to carry the power loader, hoist drum and clutch.

Power is furnished by a LeRoi or a Novo 2-cylinder engine or by an electric motor. The engine is mounted longitudinally so that all parts are easily accessible. A flexible coupling connects the engine take-off shaft to the gear reduction unit.

A large round discharge chute made of high carbon steel with a steep slope reaches well back into the drum and discharges a full batch in from 7 to 9 seconds. The chute is entirely out of the drum during the mixing period. A swinging splash plate hangs in front of the discharge opening. The skip goes up in 7 to 8 seconds. The hoist clutch drum turns on a stationary shaft collar, which is bolted to the side of the unit. A replaceable nose piece is provided for the skip to take any of the wear. The clutch is released by an automatic knock-out and the brake automatically set when the skip reaches its highest point.

The 7-S mixer water control tank is designed with a siphon which cuts off accurately and quickly without dribble. An easy quick-setting gage, as well as a gage glass, is provided for the convenience of the operator. It is equipped with the Ransome poppet non-passing valve.



*The New Ransome 7-S Mixer*

## There Are 7 Sizes

*The photo below shows the Killefer 2½-yard model revolving scraper at work in gravel screening plant.*



*You will find an unequalled assortment of sizes in the Killefer line of revolving scrapers, a size and capacity properly suited to your tractor's power*

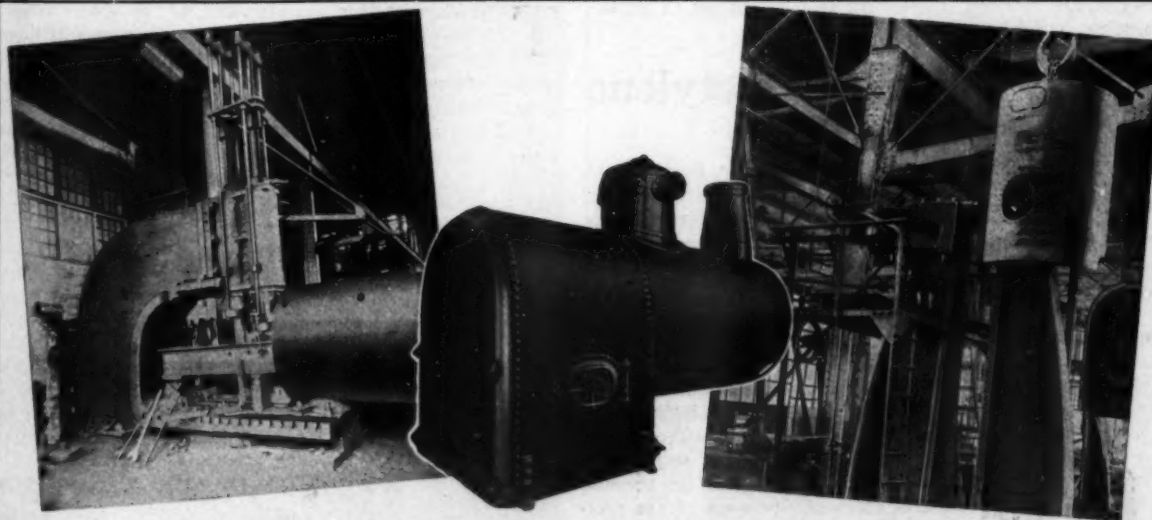
*These scrapers have quick, simple load adjustments, bolted blades, reversible shoes and other desirable features.*

*There are 6 years of successful performance in long hard service behind these rugged tools.*

*Sizes from 4' to 8' in width. Capacities from 18 to 81 cubic feet, conservative dirt measure.*

*Write for folder showing all models. Killefer Mfg. Corp. 5525 Downey Road, Los Angeles, Calif. Dealers in U. S. and Canada.*

## Killefer Revolving Scrapers



## Modern Machinery Speeds Production of JOHNSTON BOILERS

For sixty-five years Johnston Brothers have specialized in boilers for contractors' equipment. In the evolution from iron to steel, from hand-built to machine-built, from unit building to mass production, this organization pioneered. Welding equipment was first installed in the Johnston plant more than twenty years ago.

Today experienced workmen who have grown up with the Johnston organization, and modern boiler-making machinery speed the production of Johnston Boilers. You can bring your boiler problems to Johnston Brothers confident that men with years of experience will build your boilers and that you will get delivery when you want it.

**JOHNSTON BROS. INC., Ferrysburg, Mich.**  
*Specializing in Boilers for Contractors' Equipment*

Please mention the CONTRACTORS AND ENGINEERS MONTHLY—it helps.





*The New Russell Sixty Elevating Grader*

## An Elevating Grader With Power Take-Off

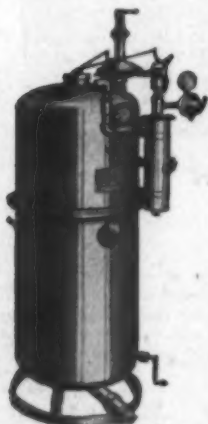
**A** NEW elevating grader which has a greater capacity than any previous models of the same line has recently been put on the market by the Road Machinery Division of the Caterpillar Tractor Co., San Leandro, Calif. This machine, which is known as the Russell Sixty, is built for power take-off only and no provision for bull gear drive has been made. This power take-off is particularly efficient in soft or loose ground where there is often considerable loss of power from slippage.

The Russell Sixty weighs 12,800 pounds. The line shaft is 2 7/16 inches in diameter and is fitted with self aligning roller bearings. The countershaft sprockets and wheels operate on roller bearings. Both upper and lower drum shafts are equipped with bronze bushings. Convenient foot latches for all adjustment ratchets increase ease of operation.

## A New Portable Acetylene Generator

**A** NEW portable acetylene generator for welding and cutting has recently been developed by the Alexander Milburn Co., 1416-1428 West Baltimore Street, Baltimore, Md. This generator, the body of which is of drawn seamless steel throughout, is made in three sizes, 35, 70 and 100-pound capacity.

The new Milburn generator is very simple, having no clocks or motors and notably few moving parts. The carbide hopper feed control and head are assembled in one unit which can be detached from the seamless steel body by the removal of a few bolts. The carbide feed is controlled by a single valve which responds to high or low pressure and automatically stops if the pressure is at zero, or if the filler plug is open or the generator is not properly closed.



*The New Milburn Portable Generator*

The safety features of the generator under various conditions of usage, upsetting and tipping prevent any rise in the pressure of the gas or abnormal working of the machine. The generator is equipped with blow-off valves, pressure control, safety gas purifier and strainer. The component parts of the machine are made with over-size outlets all welded into the seamless body of the generator.

## Steel Concrete Spaders

**S**TEEL concrete spaders, known as True Temper tampers, are manufactured by the American Fork & Hoe Co., 1937 Keith Bldg., Cleveland, Ohio. These spaders were designed especially for use by cement contractors and those engaged in building concrete walls, walls and drives and similar work. The shank and handle of the tamper are offset from the plane of the blade so that it can be pushed down flush with the side of the form. By doing this very fine concrete is brought toward the form, thus making a smooth surface after hardening and removing the form.

These spaders, made in both the slotted socket heavy pattern and the solid blade light shank pattern, come in two sizes, a 7-inch heavy blade, socket pattern and offset shank with a neck about 3/4-inch in diameter and a 6-inch heavy blade, shank pattern with offset shank and neck about 5/8-inch in diameter.

The handles of these spaders are made of ash, 4 1/2 feet long, with the name True Temper burned into each handle. Right repair handles may be secured whenever the original handles wear out or longer handles will be furnished on request.

The use of such a tool as this in wall construction insures fine finish with a total absence of any honeycomb in the concrete against the form.

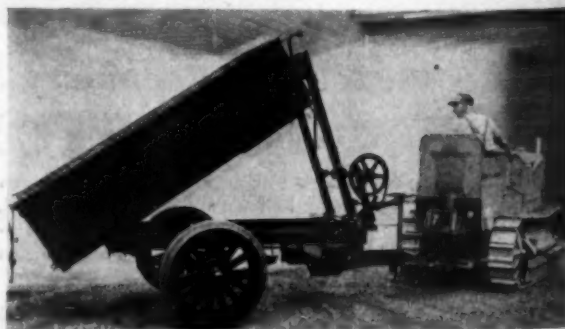


*A Concrete Tamper*

## Power Hoist Trailers for Tractor

**T**HE Miami trailer, manufactured by the Miami Trailer-Scraper Co., Troy, Ohio, is a new unit for industrial and construction service where low height is desirable. The trailer is dumped by the tractor operator from the seat by means of the Miami winch, thus saving time in unloading. A special screw jack can be furnished for attachment to the drawbar so that the trailer may be spotted at any convenient place to receive the load. The special Miami hitch permits quick coupling to the tractor. The trailer can be furnished with a hand hoist to permit dumping by hand where the tractor has no winch.

The winch case attaches directly to the rear of the transmission case. No power take-off or stationary drive is necessary. The winch, when operating with a Model Ten Caterpillar, has a cable speed of 90 feet per minute and a drum capacity of 160 feet of 3/8-inch cable; with the Model Fifteen, a cable speed of 70 feet per minute and a drum capacity of 160 feet of 3/8-inch cable, and with a Model Twenty, a cable speed of 90 feet per minute and a drum capacity of 300 feet.



*The Miami Trailer Dumped by Means of a Winch Operated From the Tractor Driver's Seat*

**Self priming!**

## Homelite

### PORTABLE CENTRIFUGAL PUMP

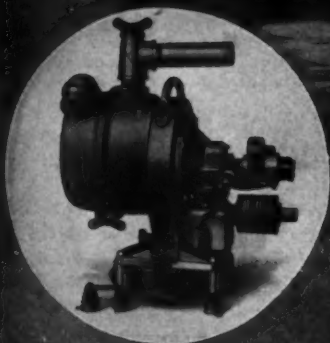
For a flood or a trickle. Pumps 6000 gal. per hr. or one gal. per hr. if that's all there is. You needn't stop the engine when the hole goes dry temporarily—it's air cooled. Complete outfit weighs but 75 lbs.—an easy one-man carry.

There's a distributor near you for demonstration and service. Write us for his name and address.

### HOMELITE CORPORATION

71 Riverdale Avenue  
Port Chester, N. Y.

☎ 3723



## The fastest and most powerful buckets ever built—

A new line of Clamshell "Super-buckets," that will outdig any others you have ever used. *Guaranteed to show you Greater Digging Power and More Speed.*

The WILLIAMS "Champions" welcome competition, and invite comparative tests!

When you inspect these new "Champions" you'll see at once how the many improvements—combined with exclusive features used successfully on past WILLIAMS buckets—have made these the *biggest bucket values ever offered.*

*21 points of Superiority.* Write for Bulletin "C," giving full description of the WILLIAMS "Champions"—and we'll make arrangements to have you test one of these super-buckets on your work.

## G. H. WILLIAMS COMPANY

609 Haybarger Lane, Erie, Pa.

Branch Offices: New York, Pittsburgh, Chicago

# WILLIAMS

FAST-DIGGING BUCKETS

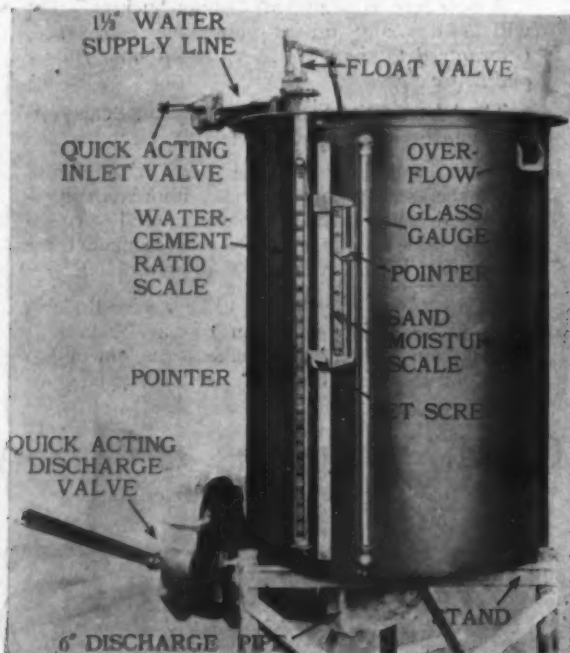
## A Water Measuring Tank for Concrete Aggregates

**A** NEW water measuring device for the accurate control of the water-cement ratio in the mixing of concrete has been developed by the Blaw-Knox Co., 667 Farmers Bank Bldg., Pittsburgh, Pa. This device is known as the Blaw-Knox water-cement ratio measuring tank and is designed to be used with mixers of 1, 2 or 3 cubic yard capacities as well as intermediate sizes. This tank is made in two styles, manual and automatic. Both are open top tanks and are equipped with calibrated scales on the outside of the tank, and water gage glasses showing the level of water in the tank at all times.

In the manually operated tank, the operator sets a pointer opposite the exact number of pounds of cement to be used in the batch and in accordance with the water-cement ratio specified. An auxiliary scale is provided by means of which a deduction is made from the amount of water to be measured to compensate for the moisture contained in the aggregate. The manual tank is filled to the top level for every batch. The filling is controlled by means of a float valve and an overflow prevents possibility of error. The amount of water for the batch is then fed into the mixer simply by opening the discharge valve and closing it when the desired level of water in the tank has been reached.

The automatic tank is arranged similar to the manual tank as described above, except that it is fitted with an adjustable overflow funnel located inside the tank and at the center of it. When the pointer is set for the required amount of water, the overflow funnel is automatically set at the same level. The tank is then filled, and as soon as the water reaches the overflow level, the valve controlling the supply of water is closed. When it is desired to charge this amount of water into the mixer, the discharge valve is open and the entire contents of the tank are drained into the mixer.

In both the manual and automatic tanks the amount of water measured out for each batch is clearly visible at all times. Any central mixing plant operator can operate this equipment. The inlet and outlet valves are large enough to insure quick filling and rapid discharge. The calibrated scales are of brass to prevent corrosion.



*The Blaw-Knox Water-Cement Ratio Measuring Tank*



*The Erie Multiple-Power Clamshell Bucket*

## Clamshell Bucket with Increased Digging Power

**A** NEW digging bucket which can be adjusted for the kind of material being dug has recently been developed by the Erie Steel Construction Co., Erie, Pa. The working action of this new bucket, which is known as Multi-Power, is a combination of two principles, the multiple rope and lever arm principle. This combination makes possible a bucket requiring less head room and consequently less line to overhaul, which in turn speeds up the operation of the bucket.

The scoops are oversize with but very little added bucket weight. Counterweights in 100-pound units can be added by one man. They are attached to the bucket by two bolts and can be put on or taken off in but a few moments. The stops are improved, relocated and lengthened, thus adding reinforcement to the power arm. The main bearing is wider. All ropes end in wedge and socket. Roller bearings can be furnished in the power arm sheaves if desired. The teeth are of the self-burying chisel point type and pull the bucket down into the material while closing.

The sheaves are of steel and are kept clean by special sheave cleaners. Large bearings keep the parts in alignment. There are heavy down thrust lugs on the bucket scoops to relieve the rivets. The down thrust is actually on the edge of the bucket. Lubrication is by the Alemite system, and a grease gun is furnished with each bucket.

## Night Work on an Asphalt Job

**O**N an 11-mile Topeka job in New York State, Mayer Bros., Erie, Pa., was being pushed by the district engineer, Charles L. Waters, to duplicate the asphalt plant to speed the work. The contractor preferred running a night shift and was permitted to try it. Experience showed it was better to lay the binder course at night and the top course during the day. Difficulty was also experienced with illumination. A uniform illumination was necessary to reduce shadows and high lights. This required a large number of lights.

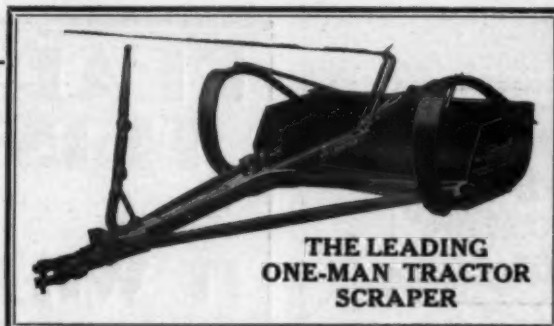


**Schaefer**  
CLEVELAND

The SCHAEFER One-Man Tractor Scraper has attained a prominent place in the contracting field because of the simple and easy way in which it moves earth at very low cost. It loads, dumps, spreads and levels—all operations are controlled from the tractor seat. It will pay you to investigate this scraper.

Write for our circulars

4180 LORAIN AVE.



THE LEADING  
ONE-MAN TRACTOR  
SCRAPER

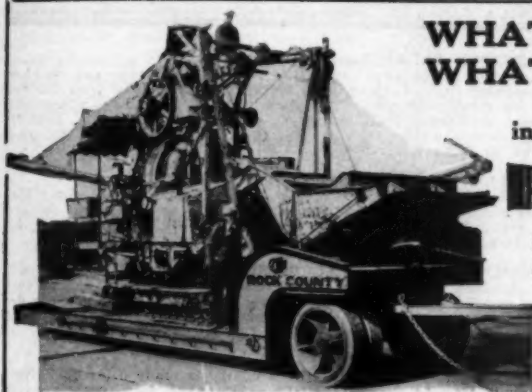
The Gustav Schaefer Company

**Schaefer**  
CLEVELAND

SCHAEFER One-Man Tractor Scrapers are furnished in 4, 5, 6- and 7-foot widths.

The New Auxiliary Back-Up Control is handy for short hauls, excavating and back-filling because it operates the scraper back-and-forth like a shuttle. In this case the tractor makes no turns—requiring less space and saving valuable time.

CLEVELAND, OHIO



## WHAT Do You Have to Move? WHAT Is Your Line of Business?

If you are a contractor and will furnish the above information we will advise just which

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is adapted for handling your work with satisfaction and a definite saving.

If you are a moving contractor we'll show you how to establish in a most satisfactory business free from cut-throat competition and capable of paying a very nice profit.

Write for Catalog 38

ROGERS BROTHERS CORPORATION

108 ORCHARD ST.  
ALBION, PENNA.

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## CHIPPING CHISELS AND SPECIAL TOOLS

are shown in our new Catalog No. 9

## THE CLEVELAND CO. STEEL TOOL CO.

Punches, Dies, Chisels, Rivet Sets  
660 E. 82<sup>nd</sup> St. Cleveland, O.



OTHER PRODUCTS—Portable Asphalt Plants, Surface Heaters, Fire Wagons, Kerosene Torches, Lead Melters.

## These Tar Kettles Are Built for Hard Service

Chausse Oil Burning Tar Kettles are noted for their sturdy construction—boiler plate kettles, welded and riveted seams, strong heat guards, heavy brazed fuel tanks, semi-elliptic springs, dependable burners.

They last longer than light weight kettles and are in use by many State and City highway departments.

Made in 1, 2, 3 and 6 bbl. sizes. Write for catalogue.

Chausse Oil Burner Company  
Elkhart, Indiana

# Newark

REINFORCED CONCRETE PIPE  
*It makes a better joint*

**Easily laid at  
small expense  
with perfect  
flow line.**



## NEWARK CONCRETE PIPE COMPANY

462 Broad St.

Newark, New Jersey



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each month and write for  
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## IT WILL

These especially selected  
catalogs and pamphlets  
of value to contractors  
are for free distribution.

## HELP YOU

### A CONCRETE SURFACER AND FINISHER

A portable electric or air-driven concrete surfer and finisher for removing fins, board or form marks and all surface irregularities from concrete construction is described in literature which the Concrete Surfacing Machinery Co. (M. Wetstein, Pres.), 4667-69 Spring Grove Avenue, Dept. F., Cincinnati, Ohio, will be glad to send to those interested.

### A DELIVERY BODY FOR READY-MIXED CONCRETE

Literature describing R. M. C. concrete delivery trucks for transporting ready-mixed concrete from the plant to the job may be secured from the Portland Concrete Machines Co. (C. B. Dutton, Pres.), 53 West Jackson Blvd., Chicago, Ill.

### AIR COMPRESSORS AND VACUUM PUMPS

Single stage, double acting, straight line air compressors and vacuum pumps and the Pennsylvania methods of compressor regulation are described in Bulletin No. 147 of the Pennsylvania Pump & Compressor Co. (W. C. Peck, Adv. Mgr.), Easton, Pa.

### COMPLETE CRANE SERVICE

Bulletin 46 describing the service rendered in many fields by Universal cranes may be secured by those interested from the Universal Crane Co., Lorain, Ohio.

### A GENERAL PURPOSE CONVERTIBLE ROLLER

A new roller known as the Davenport-Winchell roller which is designed for general contracting service and for other application where a light weight roller is required and is made in three weights, 3½, 4½ and 5½ tons, is described in literature which may be secured from the Davenport Locomotive & Manufacturing Co. (E. Parnly, Jr., Pres.), Davenport, Iowa.

### HOISTS FOR GENERAL CONSTRUCTION USE

B. Flory Manufacturing Co. (W. A. Flory, Gen. Mgr.), Bangor, Pa., will be glad to send complete information in regard to the Flor-Ox 23 and 50 hoists among the features of which are roller bearing thrusts for friction clutches, positive release device on friction levers, Alomite lubrication, extra heavy shaft and bearings, silent chain drive enclosed in dust proof casing and machine cut teeth on all mains, gears and pinions.

### A NEW POWER TAKE-OFF FOR TRACTORS

Information regarding the new rear power take-off for Caterpillar Sixty, Ten and Fifteen tractors and front power take-off for the Ten and Fifteen, may be secured from the Caterpillar Tractor Co. (W. H. Gardner, Adv. Mgr.), San Leandro, Calif.

### FACTS ABOUT THE STRUCTURAL STEEL INDUSTRY

This is the title of a booklet containing a great deal of valuable information in regard to structural steel and its uses which may be secured from the American Institute of Steel Construction (Charles F. Abbott, Executive Director), 200 Madison Avenue, New York.

### UNDERDRAINAGE

Under this title Toncan Culvert Mfrs. Assn. (H. J. Blair, Mgr.), Massillon, Ohio, has issued a technical and practical discussion of the factors affecting the intelligent design of Toncan copper molybdenum iron perforated underdrains and their applications for highways, airport and landing fields, golf courses, bridge abutments, retaining walls, foundations and many other uses.

### PORTABLE PAVING PLANTS

The Madsen portable, standardized paving plant for heavy duty in quality production of all kinds of asphaltic paving from unsegregated raw materials, is described in an interesting booklet which may be secured from the Madsen Iron Works, P. O. Box 601, Huntington Park, Calif.

### A NEW WELDING ELECTRODE

The Lincoln Electric Co. (A. F. Davis, Vice-Pres.), Cleveland, Ohio, will be glad to send to those interested complete information in regard to the new welding electrode, known as the New Kathode, for welding mild steel and for cast iron repair work.

### INTEGRAL STEEL DOOR JAMBS AND TRIM

Catalog No. 159 describing the Truscon integral steel door jambs which combine door frames, bucks, lintels, jambs, casings, door stops, transom bars and transom casings in one piece may be secured from the Truscon Steel Co. (Oscar W. Loew, Dir., Adv. and Sales Promotion), Youngstown, Ohio.

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CONCRETE WORK**

Here is a tool designed especially for cement contractors and those engaged in the building of concrete walls, walks and drives. Shank and handle are offset from plane of blade so that it can be pushed down flush with the side of the form. This brings fine concrete toward the form and insures a smooth surface, after form is removed. Improves the appearance and makes a more satisfactory job. Saves time over a makeshift tool not designed for this work.

Blade is 7" wide, slotted.  
Handle—selected ash.

The brand True Temper is burned in the handle to mark each tamper as the best tool of its kind that can be made.

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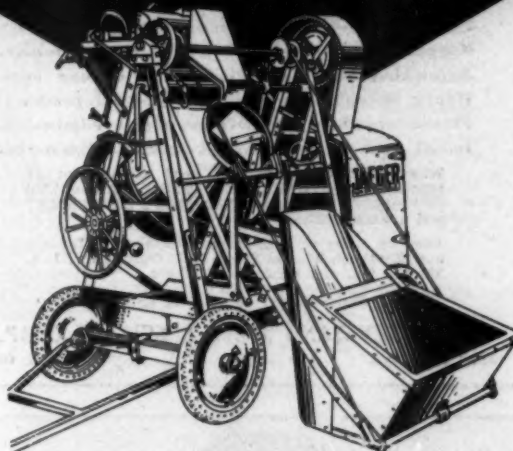
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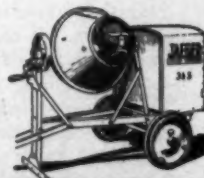
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**T**HERE isn't another one-bag tilter built that's so light and strong and easily handled, that has the automatic loader and 5 second discharge from the "Flat Spot" drum. This is the fastest outfit mixing concrete today—and the biggest money value.

Built of the best from tank to wheels, with steel, forgings and semi-steel gears and mounted on springs. One man end control. Get prices on this and other tilters, 3½, to 14 S, proportionately low priced.

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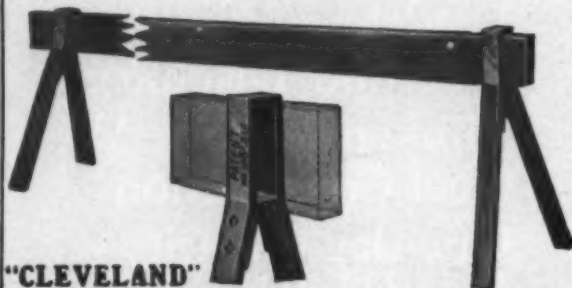
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## Read Over This List It Will Help You

### A PORTABLE CENTRIFUGAL PUMP

The Homelite Corp., 71 Riverdale Avenue, Port Chester, N. Y., will be glad to send to those interested information in regard to the Homelite self-priming portable centrifugal pump which weighs less than 100 pounds, complete with a built-in air-cooled gasoline engine, and handles from a pint a minute to 6,000 gallons an hour.

### A WATER MEASURING TANK FOR MIXERS

The Blaw-Knox Co., 667 Farmers Bank Bldg., Pittsburgh, Pa., will be glad to send to those interested complete information in regard to the new water-cement ratio measuring device for the accurate control of the water-cement ratio in mixing concrete and which is designed for use with mixers of 1, 2 or 3 cubic yard capacities as well as intermediate sizes.

### AN EASILY CONVERTIBLE SHOVEL

The Moore Speedcrane, an easily convertible shovel, trench hoe and dragline, is described in literature which the Manitowoc Engineering Works, Manitowoc, Wis., will be glad to send on request.

### CURING CONCRETE CURING TROUBLES

A 24-page Concrete Curing Booklet No. 2051 describing the use of Solvay calcium as a means of curing concrete curing troubles, may be secured from Solvay Sales Corp., 40 Rector Street, New York.

### A MIDGET HAMMER

Catalog No. 24 entitled "Pile Driving Machinery and Foundation Equipment" containing a description of the No. 9 Midget hammer which weighs 97 pounds, delivers over 250 blows per minute and strikes a 275-pound blow may be secured by any one interested from Union Iron Works, West Shore Siding, Hoboken, N. J.

### THREE-PULLEY TROUGHING IDLERS

The Conveying Weigher Co., 90 West Street, New York, will be glad to send on request complete information in regard to the Super-Weigh three-pulley troughing idlers which have malleable iron out-board brackets, Alemite lubrication and are equipped with either Timken roller or S. R. B. ball bearings.

### AN AUTOMATIC PRIMING CENTRIFUGAL PUMP

Literature on the Domestic automatic priming centrifugal pump which has a suction lift of 18 to 27 feet, picks up its own prime and automatically maintains it whenever the suction line is sealed with water and removes a large volume of water quickly, may be secured from the Domestic Engine & Pump Co. (G. A. Barbour, Sales Mgr.), Shippensburg, Pa.

### COPPER STEEL STORAGE BINS

Catalog 100 describing Beaumont storage bins which are constructed of copper bearing steel plates of rigid and bolted construction will be sent to any one writing to Beaumont Manufacturing Co. (W. G. Davenport, Mgr., S. G. S. Dept.), 330 Arch Street, Philadelphia, Pa.

### PORTABLE AND STATIONARY TAR HEATERS

Literature describing all styles of Honhorst portables and stationary tar heaters in capacities of from 25 to 200 gallons may be secured from Jos. Honhorst Co., 1016 W. 6th St., Cincinnati, Ohio.

### FOUR-CYLINDER MOTOR ROLLERS

The Huber Roller Catalog describing Huber 4-cylinder motor rollers in four sizes of 5, 7, 10 and 12 tons will be sent on request by the Huber Manufacturing Co., 330 E. Center Street, Marion, Ohio.

### PURE IRON CULVERTS AND PIPE

Complete information in regard to Armon Ingot iron pipe and culverts which offer sturdy resistance to rust and erosion will be sent on request to those interested by the Armon Culvert Manufacturing Assn. (Anton S. Rosing, Pub. Mgr.), Middletown, Ohio.

### FAST WORKING SHOVELS

A description of three models of Bay City shovels, the Model-R 26-ton heavy-duty full-revolving 1/4-yard shovel, Model-K full-revolving light 1/4-yard shovel and 10-ton tractor shovel, all of which are convertible and fast working, may be secured from Bay City Shovels, Inc. (W. S. Ramsay, Pres.), Bay City, Mich.

### A STREET REPAIR UNIT

Chausse Oil Burner Co. (W. McK. White, Pres.), Elkhart, Ind., will be glad to send literature describing the new Model H-1 Chausse street repair plant which is equipped with rubber tires, oil burners and material bins and heats the first batch in only 45 minutes.

### BOLTED AND WELDED TANKS

Bolted and welded tanks for oil, water, brine and various other liquid and dry commodities, which are easily erected or disassembled and have capacities to a million gallons and larger are described in a folder "Bolted Tanks in Industry" which the Columbian Steel Tank Co., Kansas City, Mo., will be glad to send on request.

### ACCURATE WATER METERS

Complete information in regard to Trident and Lambert water meters, the parts of which are interchangeable, thus insuring ever-renewable years of sustained accuracy and use, may be secured by those interested from Neptune Meter Co., 50 East 42nd Street, New York.

### DRAWING INKS FOR ENGINEERS

Felican Works-Gunther Wagner, Inc., 34 East 23rd Street, New York, will be glad to send complete information in regard to its black and white drawing inks as well as color chart A, showing 18 brilliant shades for use by engineers and draftsmen.

### DERRICKS AND WINCHES

The Sagen Derrick Co., 3101 Grand Avenue, Chicago, Ill., will be glad to send to those interested information in regard to its complete line of derricks and winches for use in the contracting field.

## IROQUOIS Steam-Jacketed Pipe, Fittings and Pumps

You know the trouble that is so frequently encountered in pumping asphalt and other viscous materials—they just won't flow at atmospheric temperatures. And you will be glad to know that Iroquois Steam-Jacketed Pipe, Fittings and Pumps are specially adapted to overcome such difficulties.

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Their perfection is the result of a quarter-century's experience, and they adequately meet every requirement for use in asphalt, oil and coal-tar refineries, and for plants manufacturing pre-

pared roofing, gas, chemicals, starch, glucose, molasses, fatty acids, etc.

Iroquois Steam-Jacketed Pipes have one pipe inside of another, the inner one being surrounded by steam, keeping hot the material which is to be pumped.

The Iroquois Steam-Jacketed Pump which is also a part of the Iroquois system has proved so highly efficient because of these features:

Minimum number of working parts in contact with material being pumped. Large wearing surfaces to reduce wear. Large, straight passages for liquid being pumped. Simplicity of construction insures low maintenance cost. Ease of operation with no skilled attention. Steam jackets cover all moving parts—pump can be started and stopped at will without cleaning it. Perfect accessibility of all wearing parts. No springs or small, easily broken parts in valve chambers. Handles successfully viscous material containing large quantities of foreign matter without undue wear or operating troubles.

Wouldn't you like to have full information and specifications? Write us today and we will also tell you about the complete Iroquois Line of road-building machinery.

*Iroquois Sales Department*

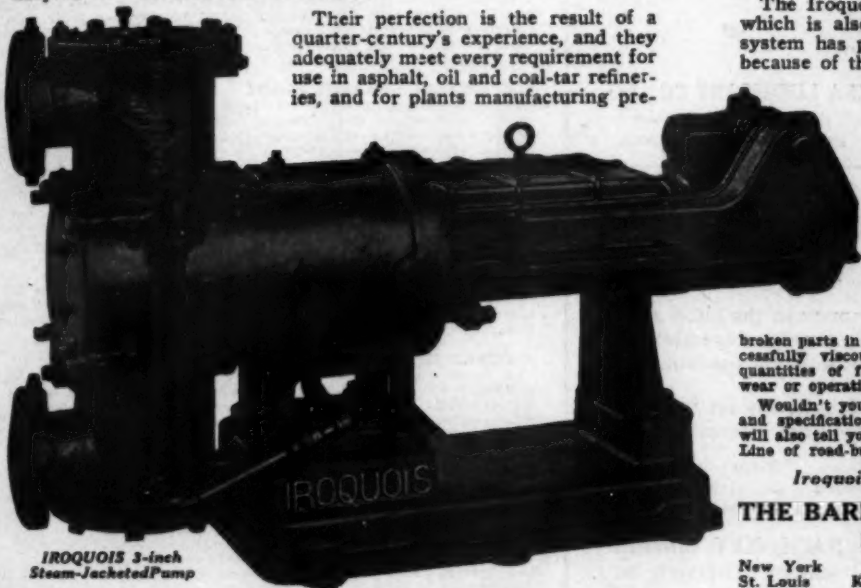
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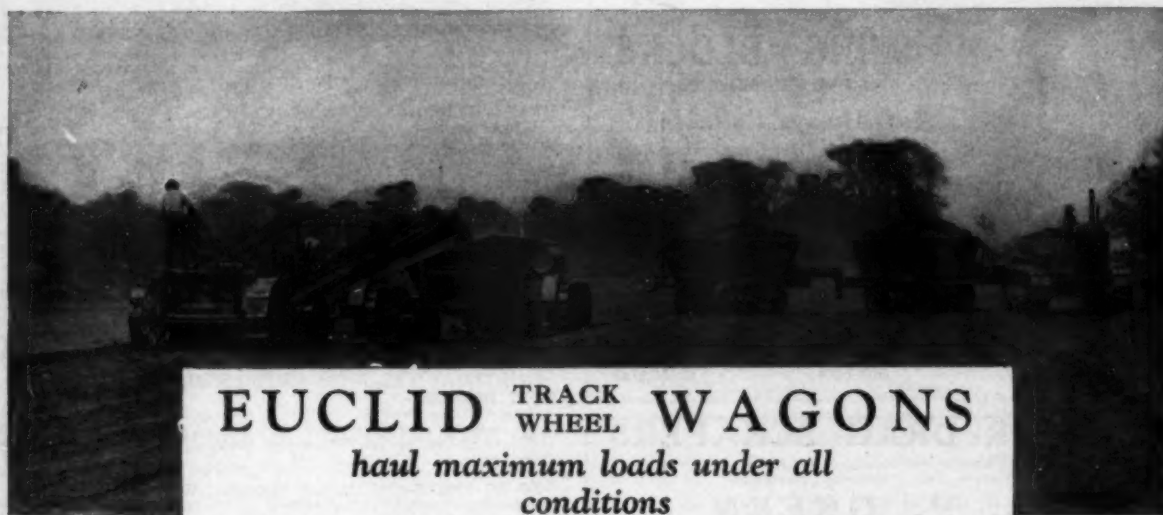
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**IROQUOIS 3-inch  
Steam-Jacketed Pump**



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haul maximum loads under all conditions

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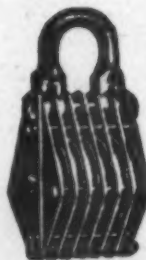
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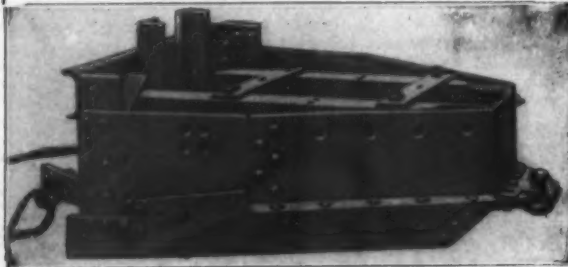
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### WHEELS AND MOUNTINGS FOR CONSTRUCTION EQUIPMENT

Catalogs describing the complete line of wheels, trucks, trailers, crawlers and parts for mounting portable construction equipment may be secured by any one interested from the Electric Wheel Co. (G. A. Tipton, Adv. Mgr.), Dept. CM, Quincy, Ill.

### MORE LIGHT AT LESS COST

Carbide lanterns for use by contractors, tunnel workmen and others desiring a strong, clear penetrating light to carry on their work are described in literature which may be secured from the National Carbide Sales Corp. (W. E. Kealey, Jr., Vice-Pres.), 342 Madison Avenue, New York.

### FOR SMOOTH DURABLE ROADS

A complete description of Tarvia Re-Tread for building new roads or for rejuvenating and widening old roads will be sent on request to any one writing the Barrett Co. (L. Wittenberg, Mgr., Tarvia Dept.), 40 Rector Street, New York.

### RELIABLE HOISTING BLOCKS

Star Brand hoisting blocks which are reliable and made for every condition of service are manufactured by the Boston & Lockport Block Co. (H. P. Abbott, Vice-Pres.), East Boston, Mass., who will be glad to send complete information on request.

### DEPENDABLE POWER FOR EVERY PURPOSE

Information in regard to heavy duty Continental engines for use in furnishing power for all kinds of construction equipment may be secured from the Continental Motors Corp., Industrial Equipment Div., Muskegon, Mich.

### A LUBRICANT FOR CONSTRUCTION EQUIPMENT

A dependable lubricant for use on construction equipment, where a heavier oil than motor oil is needed, is manufactured by the D-A Lubricant Co., Inc. (P. C. LaBlanc, Sales Mgr.), Indianapolis, Ind., who will be glad to send literature on request.

### NEW AND IMPROVED INDUSTRIAL LOCOMOTIVES

The new and improved Brookville industrial locomotives which are supplied in standard wide and narrow gauge 2 to 12 ton models, powered by McCormick-Deering-International power units, are described in literature which the Brookville Locomotive Co. (B. Eiseman, Mgr.), Brookville, Pa., will send on request.

### BOILERS FOR CONTRACTORS' EQUIPMENT

Johnston Bros., Inc. (J. F. Johnston, Pres.), Ferrysburg, Mich., will be glad to send to those interested complete information in regard to Johnston boilers of all kinds for all types of contractors' equipment.

### STURDY AND EASILY OPERATED HOISTS

Catalog No. 28, describing O. K. hoists which are sturdy, easily operated, light in weight made in single, double or triple drum types with either gasoline or electric power and ranging from 3 to 150 horsepower, may be secured from O. K. Clutch & Machinery Co. (H. Druschel, Mgr.), Columbia, Pa.

### HEAVY DUTY GAS SHOVELS

Literature describing the complete line of Osgood heavy duty gas shovels for use in all types of excavation projects may be secured on request from the Osgood Co. (Kenneth Stoltz, Adv. Mgr.), Marion, Ohio.

### HEAVY DUTY TRAILERS

A new and complete catalog of heavy duty trailers for use in construction work may be secured by those interested from Rogers Brothers Corp. (Charles A. Rogers, Pres.), 108 Orchard Street, Albion, Pa.

### A GRADER WITH TWO PIECE REAR AXLE AND DISC WHEELS

Bulletin 1076 describes in detail the Austin Mammoth Junior 10-foot leaning wheel grader with two-piece, telescopic rear axle and disc wheels. The bulletin may be secured by those interested from the Austin-Western Road Machinery Co. (H. F. Barrows, Adv. Mgr.), 400 North Michigan Avenue, Chicago, Ill.

### BELT DRESSING

Joseph Dixon Crucible Co. (B. L. Rowley, Adv. Mgr.), Jersey City, N. J., will be glad to send to those interested Circular 148-0 giving full information on the Dixon belt dressing for leather, rubber and fabric belts.

### ONE TO THREE-TON MOTOR TRUCKS

Complete information in regard to Dodge motor trucks, ranging in sizes from one ton to three tons, may be secured by those interested from the Dodge Brothers Corp. (Frank Slim, Adv. Mgr.), Detroit, Mich.

### A DITCHER WITH WELDED CRAWLER TREADS

The new 1929 Model Pony-Ditcher which is mounted on crawler treads which are over 10 feet long, electrically welded to provide strength with light weight, fitted with bronze bushings and lubricated by a modified one shot system, is described in literature which may be secured from the Industrial Brownhoist Corp. (G. F. Climo, Sales Mgr.), Cleveland, Ohio.

### CAST IRON PIPE

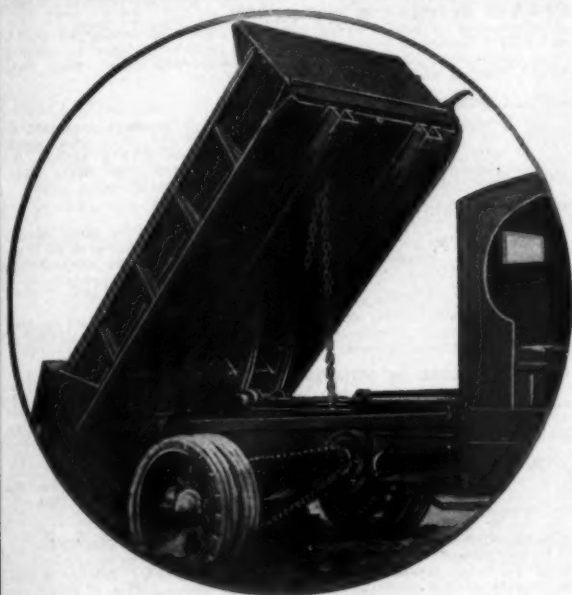
Complete information in regard to Universal cast iron pipe may be secured by those interested from the Central Foundry Co., 420 Lexington Avenue, New York.

### A NEW KIND OF BOLT FOR TYING CONCRETE FORMS

A complete description of Wedgit, the new bolt for tying concrete forms which looks and drives like a spike, withstands a 2-ton pull and is made in five lengths from 40 inches to 120 inches for tying concrete up to 8 feet in thickness, will be sent on request by Wedgit Tie Co., Inc. (George W. Laine, Jr.), 95 Liberty Street, New York.



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The WOOD LINE is complete. It includes a Hoist and All-Steel Dump Body, adaptable to your particular requirements.

Sturdy construction, high dumping angle, speed in raising, power to spare and low maintenance cost are outstanding features.

Solid satisfaction and service—*until the last load is dumped*—justify the confidence of truck manufacturers, truck users in Wood Hoists and Bodies.

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Complete information upon request

### Wood Hydraulic Hoist & Body Co.

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## Big, Hard Jobs



THE Parsons 40 has greater power per pound of machine weight than is found in any similar trench excavator. This means extra power on the bucket-chain, extra capacity per hour, extra low digging costs.

And back of this extra power is a machine built to dig the hardest sort of stuff—and like it. Just take a look at the boulders encountered by the Ecklund Construction Company on this job in Wisconsin.

When big trench must be dug through hard, rocky ground, contractors naturally use a Parsons 40. They know that you can make money on the big, hard jobs if you use the right machine.

THE PARSONS COMPANY

Newton, Iowa

Division of National Equipment Corporation



# PARSONS

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**LOOMIS "CLIPPER" DRILLS**

for  
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There is a specially designed Loomis Clipper drill for any of your work. For drilling blast holes, for quarrymen and contractors, building and bridge foundation, tests, mine air shafts, sink holes, coal prospecting, stripping, zinc and other types of mineral testing; also for drilling water and oil wells.



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**"The Strongest Geared Power  
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Capacity  
**5 Tons  
Straight  
Line**

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**POSITIVE  
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Weight  
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Two Speeds  
**4 to 1  
24 to 1**

Price \$30 F. O. B. Warehouse Point.  
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Write for descriptive  
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*"Built for service"*

**ALL STYLES**  
Portable and Stationary  
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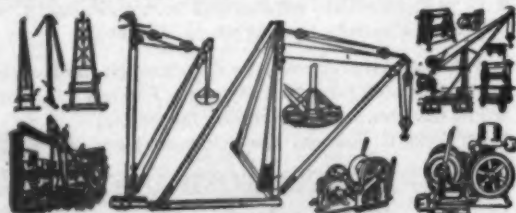
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Write for Pamphlet No. 15 on  
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We have a complete line  
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**CLAMHELL BUCKET WITH INCREASED DIGGING POWER**

Complete information in regard to the new Multi-Power clamshell bucket, the working action of which is based on a combination of the multiple rope and the lever arm principles thus making possible greater speed in operation, may be secured by those interested from Erie Steel Construction Co. (R. E. Daub, Adv. Mgr.), Erie, Pa.

**A NEW STANDARD BUILDING MIXER**

Bulletin No. 123 describing the new Ransome 7-S standard building mixer, among the features of which are increased capacity, portability, simplicity of design and speedy operation, will be sent on request to any one interested by Ransome Concrete Machinery Co. (A. F. Robinson, Sales Mgr.), Danellen, N. J.

**SIDE WINCH AND BOOM FOR TRACTORS**

Complete information in regard to the new side winch and boom for use with a Caterpillar Thirty Hillside special which is easily mounted and can pull from 12,450 in low gear to 3,000 pounds in high gear, may be secured by those interested from the Allsteel Products Manufacturing Co., Wichita, Kansas.

**TWO NEW TRUCKS FOR GENERATORS**

Information in regard to the two new types of trucks for CLP-3 and CLP-2 carbide low-pressure acetylene generators may be secured from the Oxweld Acetylene Co. (T. C. Fetherston, Mgr., Tech. Pub. Dept.), Carbon and Carbide Bldg., New York.

**AN ALL STEEL HAND HOIST**

A descriptive circular containing complete information in regard to Beebe hoists, which have a straight line capacity of 5 tons, weigh 110 pounds, have two speeds and are equipped with a positive internal brake may be secured by those interested from Beebe Bros. (R. T. Beebe, Pres.), 3219 First Ave., S., Seattle, Wash.

**STEAM AND MOTOR-DRIVEN ROLLERS**

The Buffalo-Springfield Roller Co. (J. F. Richardson, Sales Mgr.), Springfield, Ohio, will be glad to send to any one interested an illustrated booklet describing Buffalo-Springfield steam and motor-driven road rollers in all practical sizes.

**RUGGED AND DURABLE BUCKETS**

G. H. Williams & Co., 609 Haybarger Lane, Erie, Pa., will be glad to send on request copies of Bulletin C, describing the new line of Williams Champion buckets.

**COMPLETE LINE OF PUMPING UNITS**

Full details and prices on the line of Lauson pumping units, including diaphragm and centrifugal pumps in single and double diaphragm models may be secured from John Lauson Manufacturing Co., 11 Jackson Street, New Holstein, Wis.

**A QUICK CURE FOR CONCRETE**

A descriptive booklet on the use of the Hunt Process of curing concrete roads will be sent to those interested by McEverlast, Inc., 11 West Seventh Street, Los Angeles, Calif.

**A HALF-CIRCLE OR FULLY-REVOLVING 1/4-YARD SHOVEL**

Inslay Manufacturing Co., Indianapolis, Ind., will be pleased to send to those interested a complete description of Inslay 1/4-yard half-circle or full-revolving shovels, among the features of which are roller and ball bearings for the drum shafts, heavy and accurately machined castings and machine cut gears.

**PORTABLE BELT CONVEYORS**

Bulletin No. 66-C.E. containing a complete description of Fairfield portable belt conveyors which are manufactured in lengths of 30 to 60 feet, 20 or 24 inches wide and powered by either a gasoline engine or electric motor, may be secured from the Fairfield Engineering Co. (J. B. Bray, Sales Mgr.), Marion, Ohio.

**A NEW AND IMPROVED WOOD WORKER**

A complete description of the new and improved Model-D Wonder-Worker which is designed for ripping, cross-cutting, dadoing, mitering, beveling and 29 other operations by means of various tool attachments may be secured by those interested from the DeWalt Products Corp., Leola, Pa.

**ENGINES FOR CONSTRUCTION EQUIPMENT**

Bulletin No. 540 giving all the details of the Waukesha super-duty engine, among the features of which is the girder type crank case and the super-duty cylinders held by flanges midway up on the barrel, will be sent to those interested by Waukesha Motor Co., Industrial Equipment Division, Waukesha, Wis.

**A DOUBLE SLIDING SCREED FINISHER**

An illustrated bulletin describing the Ord double sliding screed road-finishing machine may be secured by those interested from A. W. French & Co., Division of Blaw-Knox Co., 8524 Vincennes Avenue, Chicago, Ill.

**WEIGHING PLANTS AND BATCHERS**

Helitzel Steel Form & Iron Co., Warren, Ohio, will be pleased to send to those interested complete information in regard to the Helitzel weighing plants, which are equipped with a 3-foot dial directly in front of the operator so he can see every pound registered.

**POWER FOR CONSTRUCTION EQUIPMENT**

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**POWER HOIST TRAILERS FOR TRACTORS**

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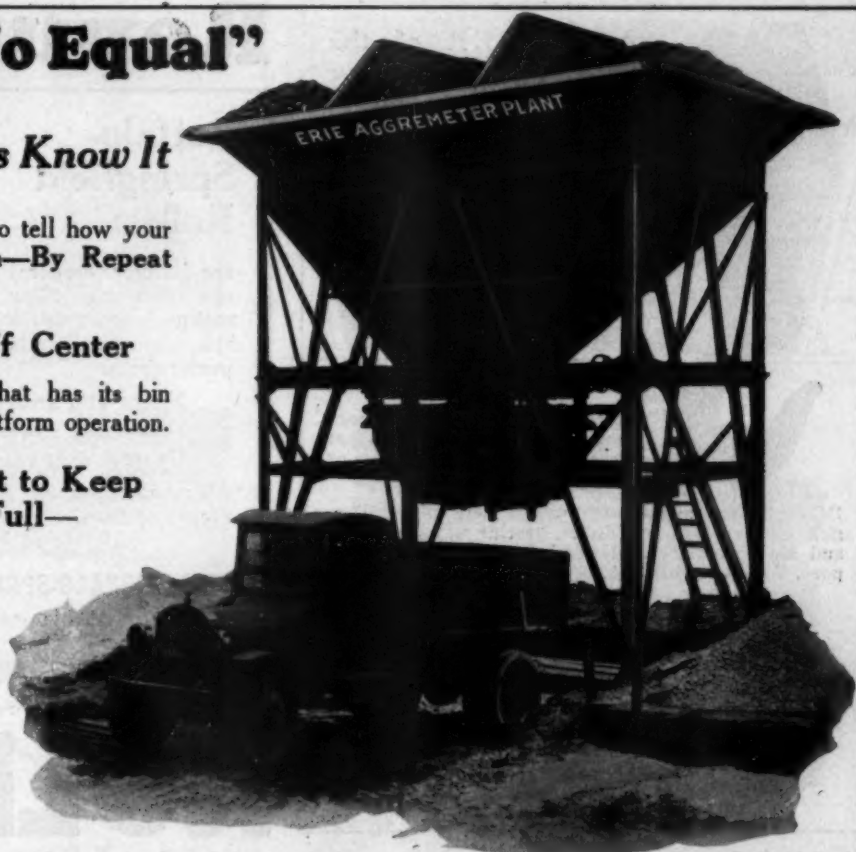
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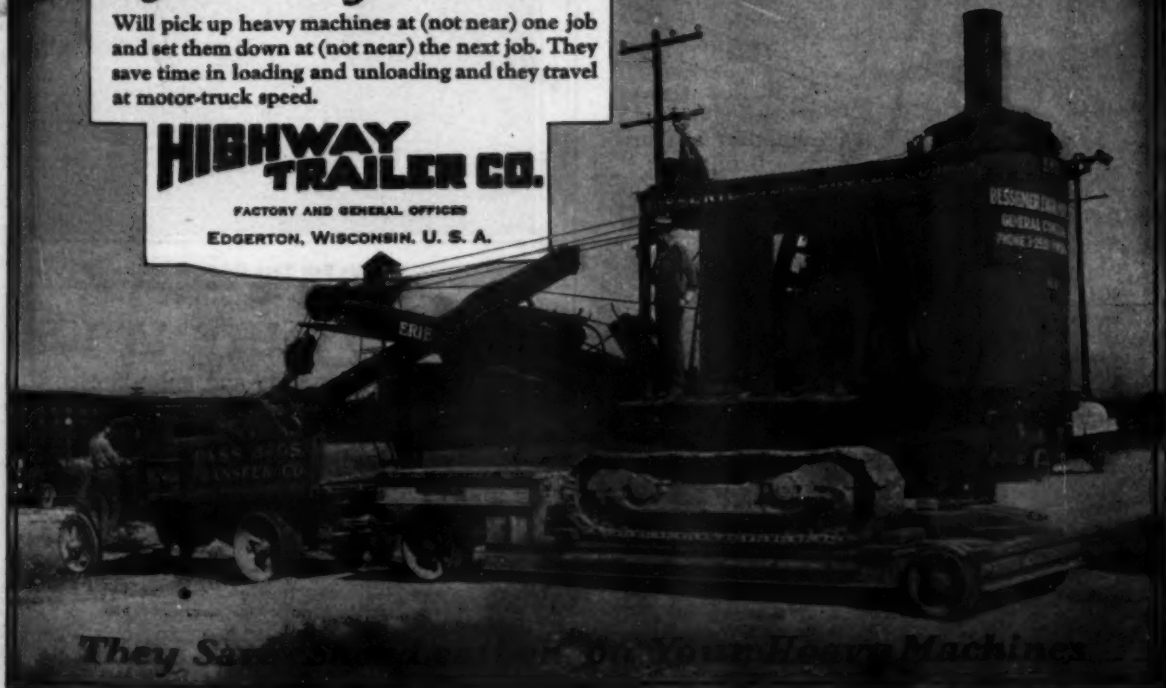


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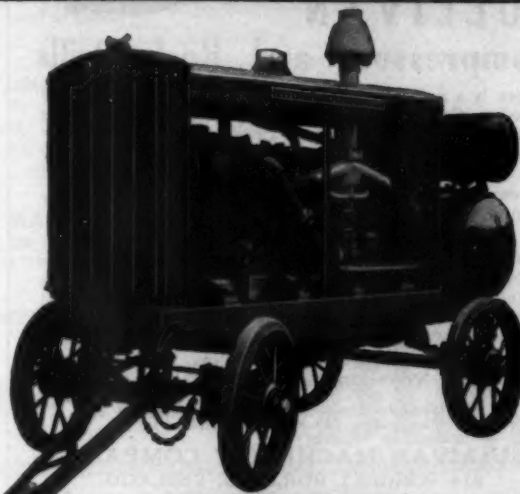
"3-C" Calcium Chloride is manufactured by the Columbia Chemical Div., Pittsburgh Plate Glass Co., under patents No. 1,592,971 and 1,527,121.



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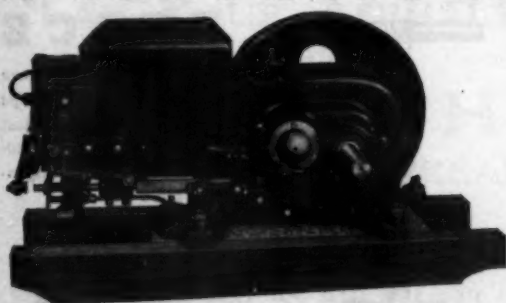
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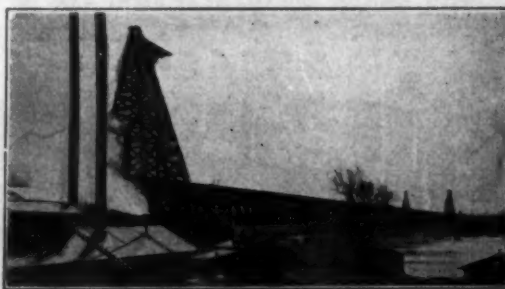
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20 inches or 24 inches wide  
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Maximum capacity assured by wide troughed  
belt without use of side boards to cut belt edges.

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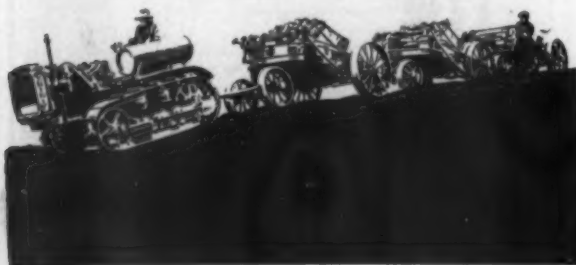
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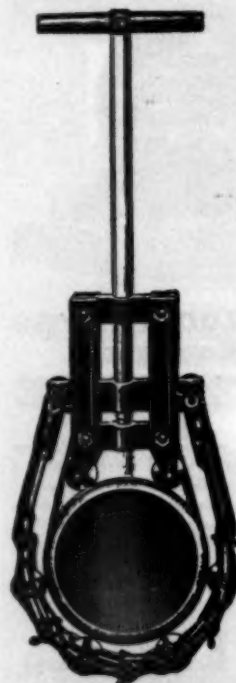
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with its six keen rotary cutting blades eats its way right through any pipe in double-quick time. Use No. 01 for all kinds of pipe 4 to 8 inches in diameter, or No. 1 for pipe 4 to 12 inches in diameter.

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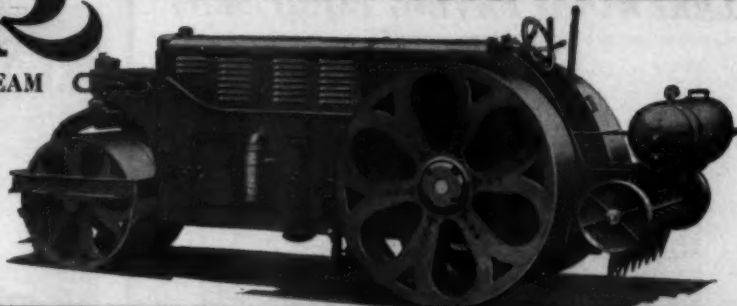
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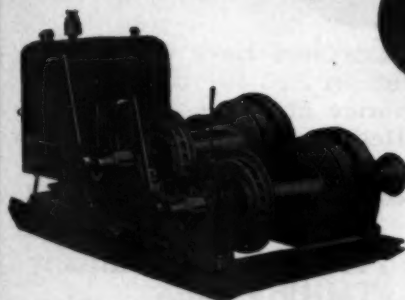
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## HOISTS AND

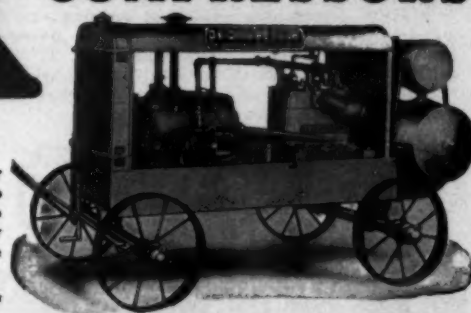
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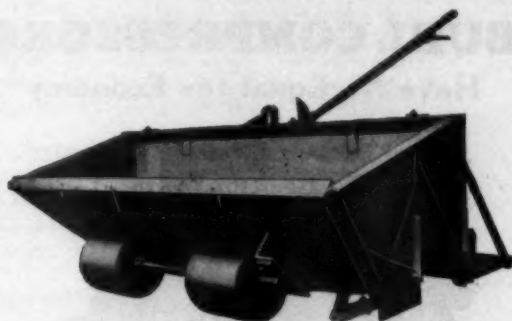
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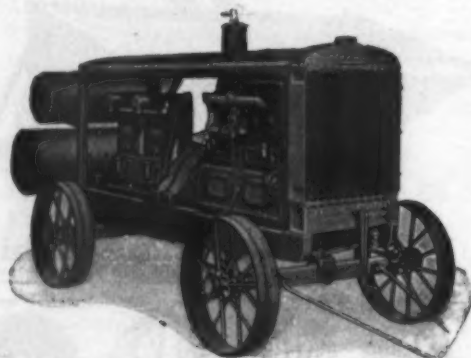
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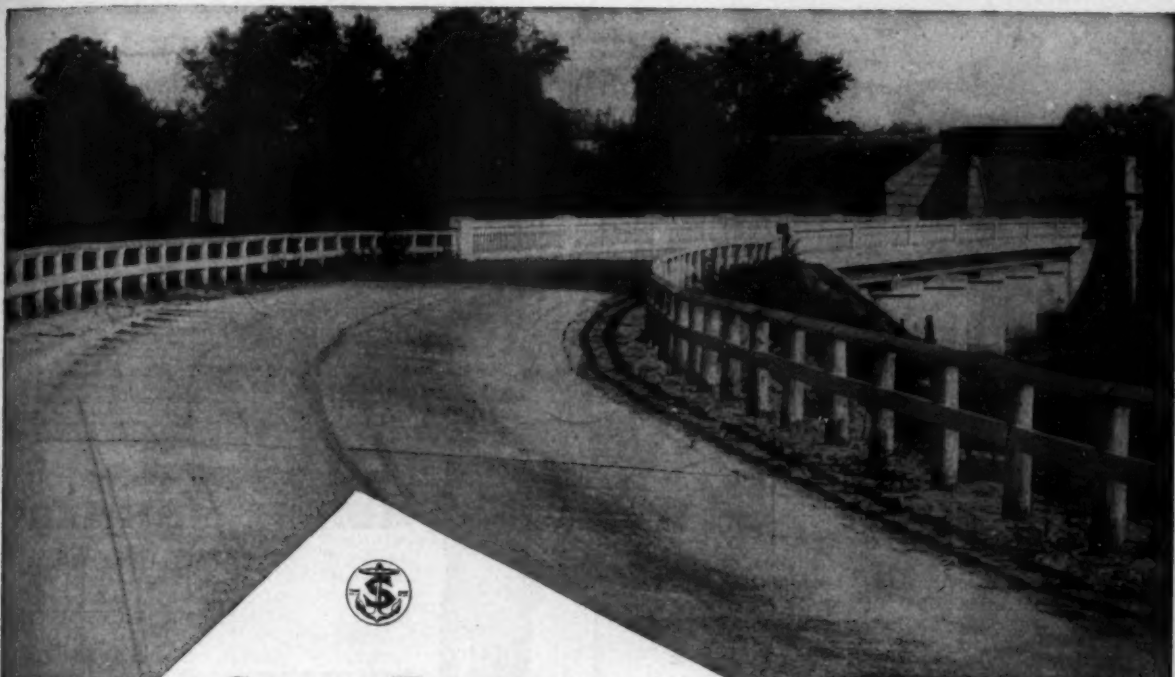
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*Flake 77%-80%*

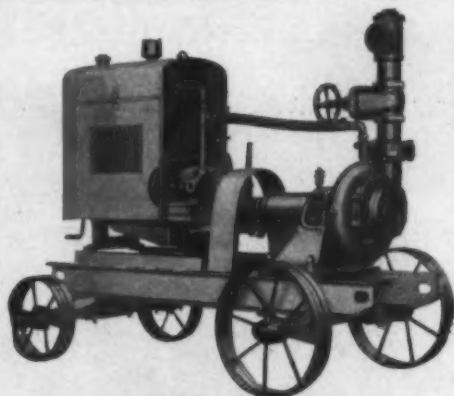
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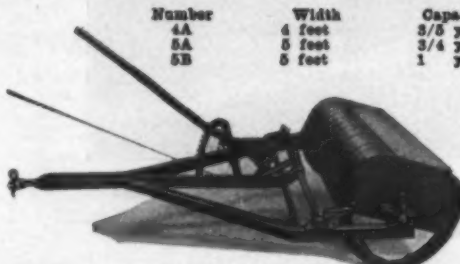
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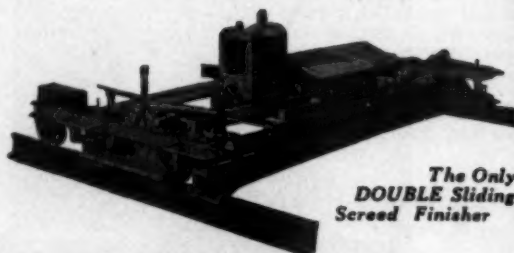
**THE RODERICK LEAN COMPANY**  
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Number	Width	Capacity
4A	4 feet	3/5 yard
5A	5 feet	3/4 yard
5B	5 feet	1 yard



A long lever regulates depth of cut. Bites as deep as desired and stops loading instantly. No stalling, no over-loading. A simple and positive control for loading, dumping and spreading.

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The Only  
DOUBLE Sliding  
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In addition to producing a high quality pavement, the **ORD Road Finishing Machine** operates at a speed that keeps pace with the maximum output of the mixer—that's profit speed.

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**A. W. FRENCH & CO.**

DIVISION OF BLAW-KNOX CO.

Manufacturers of the ORD Concrete Road Finisher

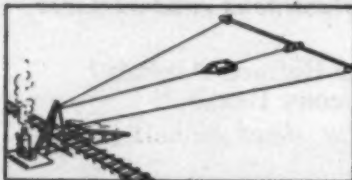
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Screw Jack  
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Visible Screw

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The ANDERSON hook is absolutely safe under all conditions and is an essential part of hoisting equipment wherever hooks are required.

This hook cannot accidentally become unfastened when attached to load nor will it, at any time, foul or snare projections or obstructions, whether carrying the load or running free.

Note the re-inforcing, flared lips at the bottom of hook which provide a sure and quick method of attaching, thereby forming an interlocking link. A half-turn of the hand releases the attachment and the hook automatically snaps back to closed position.

The ANDERSON Safety Hook is made in varied designs and sizes to meet all requirements. It is being used in many important industries and is highly indorsed by engineers.

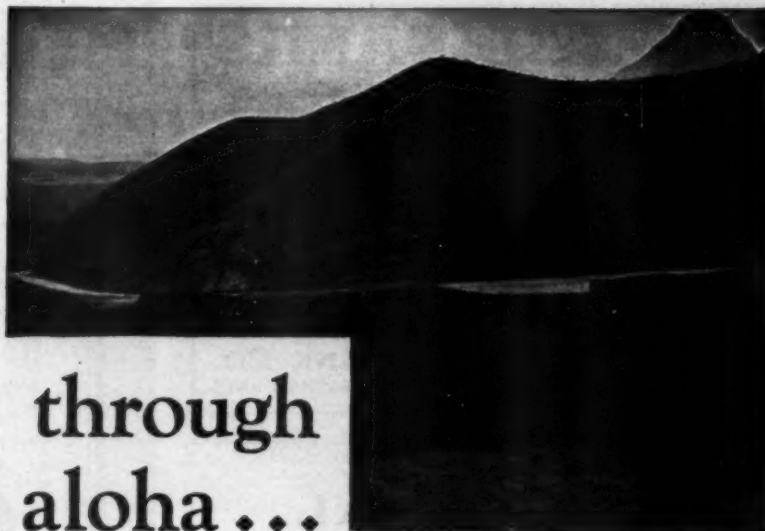
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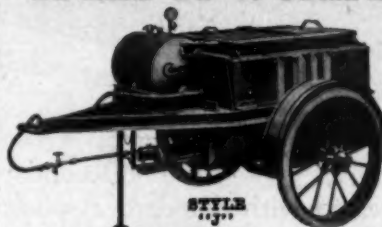
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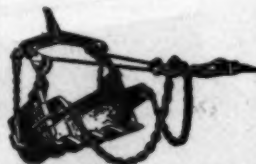
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